GRASSES OF BRITAIN.

THE

GRASSES OF BRITAIN.

BY

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ILLUSTRATED BY FIGURES
DRAWN AND ENGRAVED BY THE AUTHOR.

> As grass arises, by degrees unseen,
> To deck the breast of earth with lovely green,
> Till Nature's order brings the with'ring days,
> And all the summer's beauteous pomp decays.
>
> *Parnell's Poems.*

WILLIAM BLACKWOOD AND SONS, EDINBURGH;
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PREFACE.

When, in the autumn of 1842, I published my volume on the Grasses of Scotland, I stated at one part of the preface, "My original purpose was to embrace in this work all the Grasses of the United Kingdom, but the want of recent specimens of the Grasses peculiar to England and to Ireland made it necessary that, for the present, I should limit my plan. I propose, however, as soon as I have gained the proper opportunities, to publish a similar account of those additional species." Having taken pains since that time to procure those opportunities, I hasten to redeem my promise, by placing before the public the completion of my original plan.

The volume or part now published contains, on the plan followed in "the Grasses of Scotland," a description of all the additional species peculiar to England as well as to Ireland.

Of a few of the species common to Scotland and to one or both of the other great divisions of the United Kingdom, the descriptions have been repeated; and this has been done expressly as often as it appeared that any thing had been omitted, or that any characters could be added or amended, so as to render the distinction of closely allied species more easy. For example, all the species and varieties of the genus Bromus are described in this volume, or there is a repetition of the descriptions of all the species met with in Scotland, and therefore given formerly in the "Grasses of Scotland;" for the species of this genus are more numerous in England than in Scotland, and every botanist will perceive at once a ready source of the improvement of former descriptions in the comparison of a greater number of species.

The plates are not placed, as in "the Grasses of Scotland," at the end of the work, but, for greater ease of reference, opposite to the descriptions to which they relate.

No pains have been spared to make the arrangement of the Tribes and Genera as practically useful as possible, which has led to some variations on the groups employed in "the Grasses of Scotland."

With the same purpose of rendering the work as practically useful as possible, I have introduced a few tables, which I hope may prove of service in facilitating the progress of the student in this difficult department of botany. The first table exhibits the Grasses of the United Kingdom arranged according to their time of flowering from the first week of April to the third week of August. In a separate column of the same table is indicated the week of the summer and autumn months in which the seeds ripen, and in the remaining columns are shown the habitat as peculiar to one or more of the divisions of the United Kingdom, or common to England, Ireland, or Scotland, also the page where each grass is described, and the number of the plate where it is figured.

The remaining tables are of less interest to the botanist, being drawn from authorities on agriculture, and designed to afford to the cultivator some hints of a general kind, under different circumstances, for the choice and management of grasses.

In conclusion I have only to add, that, to obviate misunderstanding hereafter as to the species and varieties, I shall deposit with the Linnean Society of London a specimen of the original grass plants employed in the descriptions and figures throughout the entire work.

EDINBURGH,
March 1*st* 1845.

DISTRIBUTION OF THE BRITISH GRASSES,

AND

AVERAGE PERIODS AT WHICH THEY FLOWER AND RIPEN THEIR SEED.

	Found in England.	Ireland.	Scotland.	APRIL. Time of flowering.	Time of ripening the seed.	Page.	Plate.
Knappia agrostidea	...			1st week	4th week, May	168	LXXIII.
Anthoxanthum odoratum,	...	...	...	2d week	2d week, June	23	VIII.
Sesleria cœrulea,	...	...	...	3d week	3d week, June	63	XXVII.
Alopecurus pratensis,	...	...	...	4th week	3d week, June	11	IV.
Poa bulbosa,	...			4th week	4th week, May	202	LXXXIX.
—— annua,	...	...	...	The whole summer		90	I.
—— —— (var.) serica,	...	...	...	Do.	Do.	91	XLI.
				MAY.			
Hierochloe borealis,			...	1st week	2d week, June	72	XXXI.
Aira præcox,	...	...	...	3d week	3d week, June	57	XXV.
Bromus mollis,	...	...	...	4th week	2d week, June	110	XLVIII.
				JUNE.			
Alopecurus geniculatus,	...	...	...	1st week	3d week, July	14	V.
Melica nutans,	...		...	1st week	4th week, July	43	XVIII.
Poa pratensis,	...	...	...	1st week	1st week, July	73	XXXI.
—— —— (var.) planiculmis,	...	...	...	1st week	1st week, July	74	XXXII.
—— —— (var.) umbrosa,	...	...	...	1st week	1st week, July	74	XXXII.
—— —— (var.) arida,	...	...	...	1st week	1st week, July	74	XXXIII.
—— —— (var.) retroflexa,	...	...	...	1st week	1st week, July	74	XXXIII.
—— —— (var.) muralis,	...	...	...	1st week	1st week, July	75	XXXIV.
—— —— (var.) arenaria,			...	1st week	1st week, Aug.	75	XXXIV.
—— alpina,	...	...	...	1st week	1st week, July	81	XXXVII.
—— —— (var.) vivipara,	...	...	...	1st week	2d week, July	212	XCIV.
—— laxa,			...	1st week	1st week, July	83	XXXVIII
—— —— (var.) flexuosa,			...	1st week	1st week, July	84	XXXVIII
Bromus mollis (var.) ovalis,	...	...	...	1st week	1st week, July	258	CXVII.
—— —— (var.) pratensis,	...	...	...	1st week	1st week, July	260	CXVIII.
—— racemosus,	...	...	...	1st week	4th week, June	101	XLVIII.
—— —— (var.) subsecalinus,	...	...	...	1st week	1st week, July	264	CXX.
—— secalinus (var.) vulgaris,	...	...	...	1st week	1st week, July	268	CXXII.
—— —— (var.) velutinus,	...		...	1st week	1st week, July	270	CXXIII.
Trisetum pratense,	...	...	...	1st week	2d week, July	122	LII.
—— —— (var.) longifolium,	...	...	...	1st week	2d week, July	123	LII.
—— —— (var.) latifolium,			...	1st week	2d week, July	123	LIII.
—— pubescens,	...	...	...	2d week	2d week, July	124	LIII.
Bromus commutatus,	...	...	...	2d week	1st week, July	114	XLIX.
—— —— (var.) multiflorus,	...		...	2d week	2d week, July	274	CXXV.
—— arvensis,	...			2d week	2d week, July	276	CXXVI.

	Found in England.	Ireland.	Scotland.	JUNE. Time of flowering.	Time of ripening the seed.	Page.	Plate.
Bromus patulus, .	...			2d week	2d week, July	278	CXXVII.
Festuca bromoides, .	...	...	...	2d week	2d week, July	127	LIV.
—— —— (var.) nana, .	...	...	...	2d week	2d week, July	128	LV.
—— —— (var.) pseudo-myurus,	...	...	...	2d week	2d week, July	246	CXI.
—— uniglumis, .	...	...		2d week	2d week, July	248	CXII.
—— ovina, . .	...	...	...	2d week	2d week, July	128	LVI.
—— —— (var.) hirsuta,	...	...	...	2d week	2d week, July	129	
—— —— (var.) vivipara, .	...	...	...	2d week	2d week, July	129	LVI.
—— —— (var.) angustifolia,	...	...	...	2d week	2d week, July	129	LVII.
—— —— (var.) cæsia, .			...	2d week	2d week, July	129	LVII.
—— duriuscula, .	...	...	...	2d week	2d week, July	130	LVIII.
—— —— (var.) hirsuta, .			...	2d week	2d week, July	131	LVIII.
—— —— (var.) filiformis, .	...	...	...	2d week	2d week, July	131	LIX.
—— —— (var.) arenaria, .	...	...	...	2d week	2d week, July	131	LIX.
—— —— (var.) humilis, .			...	2d week	2d week, July	131	LX.
—— —— (var.) rubra, .	...	...	...	2d week	2d week, July	131	LX.
Hordeum maritimum, .	...	...	...	2d week	2d week, July	29	X.
—— sylvaticum, .	...			2d week	2d week, Aug.	286	CXXX.
Alopecurus fulvus, . .	...		...	2d week	4th week, July	16	V.
Anemagrostis Spica Venti, .	...		...	2d week	1st week, Aug.	39	XVII.
Melica uniflora, . .	...	...	...	2d week	4th week, July	42	XVIII.
Dactylis glomerata, .	...	...	...	2d week	3d week, Aug.	67	XXIX.
Lolium perenne, . .	...	...	...	2d week	2d week, July	141	LXV.
—— —— (var.) racemosum,	...	...	...	2d week	2d week, July	142	LXV.
—— —— (var.) angustifolium,	...	...	...	2d week	2d week, July	142	
—— —— (var.) tenue, .	...	...	...	2d week	2d week, July	142	
—— —— (var.) italicum, .	...	...	...	2d week	2d week, July	142	LXV.
Lagurus ovatus, . .	...			3d week	3d week, July	200	LXXXVIII
Poa trivialis, . . .	...	...	...	3d week	2d week, July	76	XXXV.
—— —— (var.) parviflora, .	...	...	...	3d week	2d week, July	77	XXXV.
—— nemoralis, . .	...	...	...	3d week	4th week, July	78	XXXVI.
—— —— (var.) angustifolia,	...	...	...	3d week	4th week, July	79	XXXVI.
—— cæsia, . . .			...	3d week	4th week, July	88	XL.
—— fluitans, . .	...	...	...	3d week	4th week, July	102	XLV.
Phleum pratense, .	...	...	...	3d week	4th week, July	17	VI.
Calamagrostis stricta, .			...	3d week	4th week, July	37	XVI.
Milium effusum, . .	...	...	...	3d week	2d week, Aug.	40	XVII.
Airochloa cristata, . .	...	...	...	3d week	4th week, Aug.	44	XIX.
Aira caryophyllea, .	...	...	...	3d week	4th week, July	56	XXIV.
Arrhenatherum avenaceum, .	...	...	...	3d week	3d week, July	58	XXV.
—— —— (var.) bulbosum, .	...	...	...	3d week	3d week, July	59	XXVI.
Cynosurus echinatus, .	...	...	...	3d week	1st week, Aug.	66	XXVIII.
Bromus sterilis, . .	...	...	...	3d week	4th week, July	116	L.
—— diandrus, . .	...		...	3d week	4th week, July	117	L.
—— erectus, . .	...	...	...	3d week	3d week, July	119	LI.
Phalaris arundinacea (var.) variegata, ...	...	...	...	4th week	3d week, July	188	LXXXII.
Calamagrostis lanceolata, .	...			4th week	4th week, Aug.	192	LXXXIV.
—— Lapponica .		...		4th week	4th week, Aug.	194	LXXXV.
Briza media, . .	...	...	...	4th week	3d week, Aug.	71	XXX.
Hordeum murinum, . .	...	...	...	4th week	1st week, Aug.	28	X.
—— pratense, .	...	...	...	4th week	1st week, Aug.	11	XI.
Bromus maximus, . .	...			4th week	3d week, July	254	CXV.
Poa polynoda, . . .	...		...	4th week	3d week, July	85	XXXIX.
				JULY.			
Nardus stricta, .	...	...	...	1st week	1st week, Aug.	8	II.
Alopecurus agrestis, .	...		...	1st week	1st week, Oct.	10	III.
—— alpinus, . .			...	1st week	3d week, Oct.	13	IV.

	Found in England.	Ireland.	Scotland.	JULY. Time of flowering.	Time of ripening the seed.	Page.	Plate.
Phleum alpinum, .			...	1st week	4th week, Aug.	19	VI.
Phalaris canariensis, . .	...	...	...	1st week	3d week, Aug.	26	IX.
Polypogon monspeliensis .	...		..	1st week	2d week, Aug.	32	XI.
Agrostis vulgaris . .	...	...	...	1st week	2d week, Aug.	33	XII.
—— —— (var.) pumila, .	...	...	...	1st week	2d week, Aug.	34	XII.
—— —— (var.) aristata, .	...	...	..	1st week	2d week, Aug.	34	XIII.
Poa subcompressa, . .	...		...	1st week	2d week, Aug.	204	XC.
—— polynoda, (var.) denticulata,			...	1st week	1st week, Aug.	208	XCII.
—— Parnellii, . .	...			1st week	1st week, Aug.	210	XCIII.
—— distans, .	...	...	...	1st week	1st week, Aug.	92	XLI.
—— maritima, . .	...	...	...	1st week	1st week, Aug.	93	XLII.
—— Balfouri, . .			...	1st week	1st week, Aug.	145	LXVI.
—— —— (var.) rigida, .			...	1st week	1st week, Aug.	146	LXVI.
—— —— (var.) extensa, .			...	1st week	1st week, Aug.	146	LXVI.
Holcus lanatus, . .	...	...	...	1st week	3d week, July	48	XXI.
Bucetum pratense, . .	...	...	...	1st week	1st week, Aug.	105	XLVI.
——— elatius, . .	...	...	...	1st week	1st week, Aug.	107	XLVI.
—— —— (var.) variegatum,	...	...	...	1st week	1st week, Aug.	108	XLVII.
Aira flexuosa, . .	...	...	...	1st week	2d week, Aug.	238	CVII.
—— flexuosa . .	...	...	...	1st week	2d week, Aug.	55	XXIV.
Avena strigosa, . .	...	...	...	1st week	2d week, Aug.	60	XXVI.
—— fatua, . .	...	...	...	1st week	3d week, Aug.	61	XXVII.
Cynosurus cristatus, .	...	...	...	1st week	2d week, Aug.	64	XXVIII.
Bromus squarrosus, . .	...			1st week	2d week, Aug.	280	CXXVIII.
Triticum sylvaticum, .	...	...	...	1st week	4th week, July	132	LXI.
—— pinnatum, . .	...			1st week	1st week, Aug.	290	CXXXII.
—— —— (var.) gracile, .	...			1st week	1st week, Aug.	292	CXXXIII
—— —— (var.) cæspitosum,	...			1st week	1st week, Aug.	292	CXXXIV.
—— —— (var.) compositum,	...			1st week	1st week, Aug.	294	CXXXV.
—— —— (var.) hispidum,	...			1st week	1st week, Aug.	294	CXXXVI.
—— —— (var.) hirsutum,	...			1st week	1st week, Aug.	296	CXXXVII.
—— caninum, . .	...	..	...	1st week	1st week, Aug.	135	LXII.
—— repens, . .	...	...	...	1st week	2d week, Aug.	136	LXII.
—— —— (var.) aristatum,	...	...	...	1st week	2d week, Aug.	137	LXIII.
—— junceum, . .	...	...	...	1st week	2d week, Aug.	138	LXIII.
Lolium perenne, (var.) ramosum,			...	1st week	1st week, Aug.	302	CXLI.
—— —— (var.) multiflorum,			...	1st week	1st week, Aug.	302	CXL.
—— —— (var.) submuticum,			...	1st week	1st week, Aug.	300	CXXXIX
—— temulentum, .	...	...	...	1st week	1st week, Aug.	140	LXIV.
—— ———— (var.) longiaristatum, . . .	...	...	...	2d week	1st week, Aug.	304	CXLII.
Elymus geniculatus, .	...			2d week	1st week, Aug.	288	CXXXI.
——— arenarius, . .	...	...	...	2d week	4th week, Aug.	139	LXIV.
Phleum arenarium, .	...	...	...	2d week	3d week, Aug.	20	VII.
——— Michelii, . .			...	2d week	2d week, Aug.	22	VII.
——— asperum, .	...			2d week	2d week, Aug.	180	LXXIX.
——— Bœhmeri, . .	...			2d week	2d week, Aug.	182	LXXX.
Trisetum flavescens, .	...	...	...	2d week	2d week, Aug.	126	LIV.
Ammophila arundinacea, .	...	...	...	2d week	2d week, Aug.	25	VIII.
Phalaris arundinacea,	...	...	...	2d week	2d week, Aug.	27	IX.
Polypogon littoralis, . .	...			2d week	3d week, Aug.	186	LXXXI.
Agrostis setacea, . .	...			2d week	2d week, Aug.	190	LXXXIII
——— alba, . .	...	...	...	2d week	3d week, Aug.	35	XIII.
Catabrosa aquatica, . .	...	...	...	2d week	2d week, Aug.	47	XX.
—— —— (var.) littoralis, .	...		...	2d week	3d week, Aug.	228	CII.
Briza minor, . .	...			2d week	3d week, Aug.	226	CI.
Poa compressa, . .	...	...	...	2d week	3d week, Aug.	80	XXXVII.
—— montana, . .			...	2d week	2d week, Aug.	86	XXXIX.
—— procumbens, . .	...		...	2d week	2d week. Aug.	95	XLII.
—— rigida, . .	...	...	...	2d week	2d week, Aug.	97	XLIII.

	Found in England.	Ireland.	Scotland.	JULY. Time of flowering.	Time of ripening the seed.	Page.	Plate.
Poa loliacea, . .	...	...	...	2d week	2d week, Aug.	98	XLIII.
—— sylvatica, . .	...	...	...	2d week	2d week, Aug.	99	XLIV.
—— aquatica, . .	...	...	...	2d week	2d week, Aug.	101	XLIV.
—— fluitans, (var.) subspicata,			...	2d week	3d week, Aug.	214	XCV.
—— distans, (var.) obtusa, .	...			2d week	2d week, Aug.	216	XCVI.
—— —— (var.) minor, .	...			2d week	2d week, Aug.	218	XCVII.
—— Borreri, . .	...			2d week	2d week, Aug.	220	XCVIII.
—— maritima, (var.) hispida,	...			2d week	2d week, Aug.	222	XCIX.
—— sylvatica, (var.) subaristata,	...	...	...	2d week	2d week, Aug.	224	C.
Alopecurus bulbosus, .	...			2d week	3d week, Aug.	174	LXXVI.
Bucetum loliaceum, .	...	...	...	2d week	2d week, Aug.	104	XLV.
Holcus mollis, . .	...	...	...	2d week	2d week, Aug.	50	XXI.
—— —— (var.) biaristatus,			...	2d week	2d week, Aug.	51	XXII.
Triticum cristatum, . .			...	2d week	2d week, Aug.	134	LXI.
Aira flexuosa, (var.) montana,			...	2d week	3d week, Aug.	240	CVIII.
—— alpina, (var.) vivipara,			...	2d week	3d week, Aug.	242	CIX.
—— canescens, . .	...			2d week	2d week, Aug.	244	CX.
Rottbollia incurvata, .	...		...	3d week	2d week, Aug.	9	II.
—— —— (var.) filiformis, .	...		...	3d week	2d week, Aug.	9	III.
Agrostis alba (var.) stolonifera,	...	...	...	3d week	3d week, Aug.	35	XIV.
—— —— (var.) palustris, .	...	...	...	3d week	3d week, Aug.	35	XIV.
——— canina, . .	...	...	...	3d week	2d week, Sept.	36	XV.
——— —— (var.) alpina, .			...	3d week	1st week, Sept.	37	XV.
Aira cæspitosa, . .	...	...	...	3d week	2d week, Sept.	52	XXIII.
—— —— (var.) longiaristata			...	3d week	3d week, Aug.	234	CV.
Triodia decumbens, .	...	...	...	3d week	1st week, Aug.	70	XXX.
Molinia cœrulea, . .	...	...	...	3d week	4th week, Aug.	46	XX.
Bromus asper, . .	...	...	...	3d week	4th week, Aug.	120	LI.
Bucetum giganteum, .	...	...	...	3d week	4th week, Aug.	108	XLVII.
——— loliaceum (var.) longiglume, .	...		...	4th week	3d week, Aug.	250	CXIII.
—— —— (var.) elongatum,	...		...	4th week	3d week, Aug.	252	CXIV.
Setaria viridis, . .	...			4th week	3d week, Aug.	156	LXVIII.
——— verticillata, . .	...			4th week	3d week, Aug.	158	LXIX.
Digitaria humifusa, .	...			4th week	4th week, Aug.	164	LXXI.
Cynodon dactylon, . .	...			4th week	3d week, Aug.	166	LXXII.
Calamagrostis Epigejos, .	...	...	...	4th week	4th week, Aug.	38	XVI.
Phleum pratense (v.) longiciliatum			...	4th week	3d week, Aug.	178	LXXVIII
Molinia cœrulea (var.) breviramosa, . .			...	4th week	4th week, Aug.	230	CIII.
				AUG.			
Molinia depauperata, .			...	1st week	2d week, Sept.	45	XIX.
Aira alpina, . .			...	1st week	2d week, Sept.	53	XXIII.
Arundo phragmites, . .	...	...	...	1st week	3d week, Sept.	69	XXIX.
Stipa pennata, . .	...			1st week	2d week, Sept.	198	LXXXVII
Aira cæspitosa (var.) brevifolia,			...	1st week	2d week, Sept.	236	CVI.
Phleum pratense (v) longiaristatum			...	1st week	3d week, Sept.	176	LXXVI.
Echinochloa crus-galli, .	...			2d week	3d week, Sept.	154	LXVII.
Digitaria sanguinalis, .	...			2d week	3d week, Sept.	160	LXX.
Spartina stricta, . .	...			2d week	2d week, Sept.	170	LXXIV.
——— alterniflora, .	...			2d week	2d week, Sept.	172	LXXV.
Gastridium lendigerum, .	...			3d week	4th week, Sept.	196	LXXXVI.

Average weight per bushel of such grass seeds as are in general use for cultivation, and their average prices per lb., as sold by Messrs Lawson, Edinburgh.

Botanical Names.	Average weight per Bushel.	Average prices per Pound.	Botanical Names.	Average weight per Bushel.	Average prices per Pound.
	lbs.	lb.		lbs.	lb.
Agrostis alba	12	1s. 6d.	Poa aquatica	13¼	1s. 6d.
——— vulgaris	12	1s. 0d.	—— fluitans	14½	1s. 6d.
——— ——— (var.) stolonifera	13	0s. 9d.	Holcus lanatus	7	0s. 3d.
Aira cæspitosa	14	1s. 0d.	——— mollis	6	0s. 6d.
Alopecurus pratensis	5¼	1s. 6d.	Lolium italicum	15	0s. 6d.
Ammophila arundinacea	15	2s. 0d.	——— perenne	30	0s. 3d.
Anthoxanthum odoratum	6	2s. 0d.	Milium effusum	25	4s. 0d.
Arrhenatherum avenaceum	7	0s. 6d.	Phalaris arundinacea	48	2s. 0d.
Trisetum flavescens	5	2s. 6d.	Phleum pratense	44	0s. 8d.
Triticum sylvaticum	10¼	2s. 0d.	Poa nemoralis	15	1s. 3d.
Bucetum giganteum	15	1s. 0d.	—— pratensis	13¾	1s. 0d.
Cynosurus cristatus	26	1s. 2d.	—— trivialis	15¼	1s. 0d.
Dactylis glomerata	11½	0s. 6d.			
Elymus arenarius	10	10s. 6d.	*Clovers.*		
Festuca duriuscula	9½	1s. 0d.	Lotus corniculatus	62	3s. 6d.
Bucetum elatius	14	1s. 0d.	—— major	64	3s. 0d.
——— loliaceum	15	1s. 6d.	Medicago lupulina	63¾	0s. 4½d.
Festuca ovina	13¼	1s. 2d.	——— sativa	60	1s. 0d.
Bucetum pratense	13	0s. 8d.	Trifolium pratense	64	0s. 10d.
Festuca duriuscula (var.) rubra	10	1s. 4d.	——— repens	65	1s. 0d.

*Kinds and proportions of Grass Seeds as recommended for sowing the imperial acre for alternate Husbandry.**

Botanical Names.	Light and medium Soils.			Heavy Soils.		
	For one year's hay.	For one year's hay and one year's pasture.	For one year's hay and two years' pasture.	For one year's hay.	For one year's hay and one year's pasture.	For one year's hay and two years' pasture.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Lolium perenne	10	10	10	10	10	10
——— ——— (var.) italicum	6	6	6	6	6	6
Phleum pratense	...	1	1	1	2	2
Medicago lupulina	1	2	2	1	2	2
Trifolium pratense	8	4	3	8	4	3
——— repens	2	4	4	2	4	4
	27	27	26	28	28	27

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* Mr Lawson observes, that "for three years' pasture on good soil, the substitution of two pounds of *Dactylis glomerata* for about three pounds of *Lolium perenne* in the above mixture will be found advantageous; while in sheep pastures, the addition of one pound per acre of parsley seed would also be attended with good results." *Lotus*, *Medicago* and *Trifolium* are not true grasses: they belong to the order Leguminosæ.

*For Permanent Pasture.**

Botanical Names.	Light Soil.		Medium Soil.		Heavy Soil.	
	With a crop of Corn.	Without a Crop.	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
Alopecurus pratensis	1	1¼	1¼	1½	1½	1¾
Trisetum flavescens	0¾	0¾	0½	0½	...	...
Dactylis glomerata	3	4	3	4	3	4
Festuca duriuscula	2	2	2	2	2	2
——— ——— (var.) rubra	2	2	...	...	..	...
Bucetum elatius	...	...	1	1	2	2
——— pratense	2	2	2½	2½	3	3
Lolium perenne	6	7	6	7	6	7
——— ——— (var.) italicum	5	6	5	6	5	6
Phleum pratense	1	1¼	1¾	2	2	2¼
Poa nemoralis	0¾	1	1	1¼	1¼	1½
—— pratensis	1	1	...	...	...	...
—— trivialis	...	...	1½	2	2	2½
Lotus corniculatus	0½	0½	0¼	0¼	0½	0½
—— major	...	...	0¼	0¼	0½	0¼
Medicago lupulina	1	1	1	1	1	1
Trifolium pratense	1	1	1	1	1	1
——— repens	4	5	4	5	4	5
	31	35¾	32	37¼	34¾	40

For Permanent Pasture, as recommended by Professor Low in his Elements of Practical Agriculture.

	lbs. per Imperial acre.
Alopecurus pratensis	3¾
Dactylis glomerata	0½
Phleum pratense	5
Bucetum pratense	2
Poa trivialis	0¾
Lolium perenne	12

	lbs. per Imperial acre.
Trifolium repens	5
——— pratense	3
Medicago lupulina	2
	34 lbs.

For Permanent Pastures much shaded by Trees.†

	lbs. per Imperial acre.
Anthoxanthum odoratum	6
Festuca duriuscula	2
——— ———(var.) filiformis	4
Bucetum elatius	1
Phleum pratense	1
Alopecurus pratensis	2

	lbs. per Imperial acre.
Poa nemoralis	4
Poa pratensis	3
—— ——(var.) umbrosa	3
Poa trivialis	6
	32 lbs.

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* Messrs Lawson.

† Parnell.

*For Permanent Pasture and Meadow in land ranging between the best and that of medium quality, whether with or without a corn crop, per statute acre.**

	lbs.
Dactylis glomerata	7
Alopecurus pratensis	3
Bucetum pratense	10
Phleum pratense	5
Trifolium pratense	5
——— repens	5
	35 lbs.

For improved deep Mossy Ground intended to be kept in grass. †

	lbs. per Imperial acre.
Agrostis alba (var.) stolonifera	1½
Alopecurus pratensis	0½
Festuca duriuscula	3
Bucetum pratense	1
Lolium perenne	6
——— ——— (var.) italicum	4
Phleum pratense	3
Poa trivialis	2
Lotus major	1½
Medicago lupulina	2
Trifolium pratense	1
——— repens	4
	29½ lbs.

For Lawns, Pleasure-grounds, and Bowling-greens to be kept in short grass.‡

	lbs. per Imperial acre.
Cynosurus cristatus	11
Trisetum flavescens	8
Festuca duriuscula	5
Poa nemoralis	4
Poa pratensis	2
Poa trivialis	2
Agrostis vulgaris	4
——— alba	4
	40 lbs.

For Irrigated Pastures of Medium Soil.§

	lbs. per Imperial acre.
Alopecurus geniculatus	1
——— pratensis	2
Agrostis alba	2
——— ——— (var.) stolonifera	3
Bucetum loliaceum	4
——— pratense	4
Poa fluitans	2
Lolium perenne	5
——— ——— (var.) italicum	4
Phleum pratense	2
Poa trivialis	2
Catabrosa aquatica	2
	33 lbs.

Grasses which contain the most nutritive matter at the time of flowering and when the seeds are ripe. (According to Sir H. Davy.)

At the time of flowering.	*At the time the seeds are ripe.*
Alopecurus pratensis.	Dactylis glomerata.
Bucetum pratense.	Phleum pratense.
——— loliaceum.	Lolium perenne.
——— elatius.	Poa trivialis.
Festuca duriuscula.	Agrostis alba (var.) stolonifera.
Poa pratensis.	Cynosurus cristatus.
— sylvatica.	Anthoxanthum odoratum.

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* Treatise on the Agricultural Grasses by Edmund Murphy.

† Lawson. ‡ Parnell. § Parnell.

Improvement of the Soil by laying down to Grass.[*]

" One of the most common methods of improving the land is that of *laying down to grass.* This may be done for two, three, or four years only, or for an indefinite period of time. In the latter case, the land is said to be laid down permanently, or to permanent pasture.

" *Temporary pasture or meadow.*—If the land be sown with grass and clover-seeds, only as an alternate crop between two sowings of corn, the effect is fully explained. The roots which are left in the soil enrich the surface with both organic and inorganic matter, and thus fit it for bearing a better after-crop of corn.

" If, again, it be left to grass for three or five years, the same effect is produced more fully, and therefore this longer rest from corn is better fitted for soils which are poor in vegetable matter. The quantity of organic matter which has accumulated becomes greater every year, in consequence of the annual death of stems and roots, and of the soil being more closely covered, but this increase is probably never in any *one* after-year equal to that which takes place during the first. The quantity of roots which is produced during the first year of the young plants' growth must, we may reasonably suppose, be greater than can ever afterwards be necessary in an equal space of time. Hence, one good year of grass or clover will enrich the soil more *in proportion to the time expended,* than a rest of two or three years in grass, *if annually mowed.*

" Or, if instead of being mown, the produce in each case be eaten off by stock, the result will be the same. That which lies longest will be the richest when broken up, but not in an equal proportion to the time it has lain. The produce of green parts, as well as of roots, in the artificial grasses, is generally greatest during the first year after they are sown, and therefore the manuring derived from the droppings of the stock, as well as from the roots, will be greatest in proportion during the first year. That farming, therefore, is most economical—where the land will admit of it—which permits the clover or grass seeds to occupy the land for one year only.

" But if, after the first year's hay is removed, the land be pastured for two or three years more, it is possible that each succeeding year may enrich the surface soil as much as the roots and stubble of the first year's hay had done; so that if it lay three years it might obtain three times the amount of improvement. This is owing to the circumstance that the whole produce of the field remains upon it, except what is carried off by the stock when removed—but very much, it is obvious, will depend upon the nature of the soil and upon the selection of the seeds being such, as to secure a tolerable produce of green food during the second and third years.

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[*] Lectures on Agricultural Chemistry. By James F. W. Johnston, M. A.

" *Permanent pasture or meadow.*—But when land is laid down to permanent grass it undergoes a series of further changes, which have frequently arrested attention, and which, though not difficult to be understood, have often appeared mysterious and perplexing to practical men. Let us consider these changes.

" When grass seeds are sown for the purpose of forming a permanent sward, a rich crop of grass is obtained during the first, and perhaps also the second year, but the produce after three or four years lessens, and the value of the pasture diminishes. The plants gradually die and leave blank spaces, and these again are slowly filled up by the sprouting of seeds of other species, which have either lain long buried in the soil or have been brought thither by the winds.

" This first change, which is almost universally observed in fields of artificial grass, arises in part from the change which the soil itself has undergone during the few years that have elapsed since the grass seeds were sown, and in part from the species of grass selected not being such as the soil, at any time, could permanently sustain.

" When this deterioration, arising from the dying out of the sown grasses, has reached its utmost point, the sward begins gradually to improve, natural grasses suited to the soil spring up in the blank places, and from year to year the produce becomes greater and greater, and the land yields a more valuable pasture. Practical men often say that to this improvement there are no bounds, and that the older the pasture the more valuable it becomes.

" But this is true only within certain limits. It may prove true for the entire currency of a lease, or even for the lifetime of a single observer, but it is not generally true. Even if pastured by stock only and never mown—the improvement will at length reach its limit or highest point, and from this time the value of the sward will begin to diminish.

" This, again, is owing to a new change which has come over the soil. It has become, in some degree, exhausted of those substances which are necessary to the growth of the more valuable grasses—less nutritive species, therefore, and such as are less willingly eaten by cattle, take their place.

" Such is the almost universal process of change which old grass fields undergo, whether they be regularly mown or constantly pastured only—provided they are left entirely to themselves. If mown they begin to fail the sooner, but even when pastured they can be kept in a state of full productiveness only by repeated top-dressings, especially of saline manure—that is, by adding to the soil those substances which are necessary to the growth of the valuable grasses, and of which it suffers a yearly and unavoidable loss. Hence, the rich grass lands of our fathers are found now in too many cases to yield a herbage of little value. Hence, also, in nearly all countries, one of the first steps of an improving agriculture is to plough out the old and failing pastures, and either to convert them permanently into arable fields, or, after a few years' cropping and manuring, again to lay them down to grass."

" That the richest old grass lands—those which have remained longest in a fertile condition—are generally upon our strongest clay soils. This is owing to the fact that such soils naturally contain, and by their comparative impermeability *re*-tain, a larger store of those inorganic substances on which the valuable grasses live. When the surface soil becomes deficient in any of these, the roots descend further into the subsoil and bring up a fresh supply. But these grass lands are not on this account exempt from the law above explained, in obedience to which all pastured lands, when left to nature, must ultimately become exhausted. They must eventually become poorer ; but in their case the deterioration will be slower and more distant, and by judicious top-dressings may be still longer protracted.

" The natural changes which the surface soil undergoes, and especially upon clay lands when laid down to grass, explain why it is so difficult to procure, by means of artificial grasses, a sward equal to that which grows naturally upon old pasture lands. As the soil changes upon our artificial pastures, it becomes better fitted to nourish other species of grass than those which we have sown. These naturally spring up, therefore, and cover the soil. But these intruders are themselves not destined to be permanent possessors of the land. The soil undergoes a further change, and new species again appear upon it. We cannot tell how often different kinds of grass thus succeed each other upon the soil, but we know that the final rich sward which covers a grass field when it has reached its most valuable condition, is the result of a long series of natural changes which time can only bring about.

"The soil of an old pasture field, which has been ploughed up, is made to undergo an important change both in texture and in chemical constitution, before it is again laid down to grass. The same grasses, therefore, which previously covered it will no longer flourish, even when they are sown. Hence the unwillingness felt by practical men to plough up their old pastures—but hence, also, the benefit which results from the breaking up of such as are old, worn out, or covered with unwholesome grasses. When again converted into pasture land, new races appear, and a more nourishing sward is produced.*

For the general management of grass land and directions for sowing grass seed, the reader is referred to "The Book of the Farm, by Henry Stephens," and "Professor Low's Elements of Practical Agriculture."

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* For an excellent article on the superior feeding qualities of recent artificial grasses over many old pasture lands by Mr Boswell, of Kingcaussie, see the *Quarterly Journal of Agriculture.*

The following carefully conducted series of experiments were made by Mr Fleming, of Barochan, with the view of determining the *relative effect of saline substances upon the weight of the hay crop*, on the field where the experimental wheat of 1841 was grown:—Result of Experiments tried upon sown Grass, cut for Hay on 30th June 1842, Crook's Farm, where the Wheat grew in 1841. *The quantity of land in each plot was one-sixteenth of an imperial acre.*

No.	Description of dressing.	Quantity applied to one-sixteenth of an imperial acre.	Produce in imperial lbs. when cut.	Weight in imperial lbs. when cut, per imperial acre.	Increase per imperial acre, in lbs.	Weight when dried, 22d of July.	Quantity of dried Hay yielded by 1000 lbs. fresh cut.	Weight in tons, &c., when cut green, per acre, 30th of June.		
		lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	tons.	cwt.	qrs.
	Nothing		710	11,360	—	195	275	5	1	2
1	Sulphate of Soda	21	484	7,740	—	163	337	3	9	0
2	Common Salt	21	672¼	10,960	—	176	262	4	17	3
3	Nitrate of Soda	10½	1125	18,100	6640	351	312	8	0	3
4	Sulphate of Soda Nitrate of Soda, mixed	7 3½	515	8,240	—	186	362	3	13	2
5	Natural Guano	10½	932½	14,920	3560	256½	275	6	13	1
6	Silicate of Potash Gypsum	3½ 21	757½	12,120	760	198	262	5	8	1
7	Sulphate of Ammonia	7	820	13,120	1760	225	275	5	17	0
8	Turnbull's Guano	14	595	9,520	—	186	312	4	5	0
9	Common Salt Soot	14 1 bushel.	795	12,720	1360	228	287	5	13	2
10	Hay of Barley Land, manured with Bone-dust, 1841		940	15,840	3680	305	324½	6	14	1

Remarks.—Nos. 1, 2, 3, 4, 5, and 8, were all dressed on the 9th of April, the weather being very dry at the time, and their effects were hardly perceptible; but in the last week of April Nos. 3 and 4 showed an improvement over the others. We had heavy rains the first week of May, and by the 7th of May the nitrate of soda (No. 3) could be seen at a distance by the alteration of the colour to dark green, and its height above the others; upon that day Nos. 1 and 2 showed no visible alteration from the undressed. No. 3 was the best of any: taller, and of a dark green colour, and thicker swarded. *No. 4 showed little or no alteration in colour, but was fully longer than the general crop, and presented the remarkable appearance, as did No. 1, in being nearly all* Festuca Rubra, *with hardly any rye-grass, although of this grass, viz.* (Festuca Rubra,) *none was sown: the field having been sown with rye-grass, timothy, and red clover.* No. 5 darker than No. 4 in the colour, and good; but No. 8 hardly improved. Nos. 6, 7, 9, and 10, were dressed upon the 7th of May. The men in ploughing up the stubble of 1841 found that the ridges which were top-dressed that season with nitrate of soda, were more difficult to plough, from the strength and depth of the grass roots, than the ridges undressed, each alternate ridge only having been dressed.

Prices of Manures.—Sulphate of Soda, 7s. per cwt.; Nitrate of Soda, £1 per cwt.; Natural Guano, 25s. per cwt.; Artificial Guano, 8s. per cwt.; Silicate of Potash or Soluble Glass, 15s. per cwt.; Sulphate of Ammonia, £1 per cwt.

GRASSES OF BRITAIN.

ONE HUNDRED AND THIRTY-THREE SPECIES, AND SEVENTY-TWO VARIETIES.

CLASS MONOCOTYLEDONES.

Stem with no distinction of bark, wood, and pith; increasing in the centre, so that the oldest formation is external. Leaves with parallel veins. Cotyledon one; radicle inclosed in a sheath.

ORDER GRAMINEÆ.

Stem hollow,* closed at the joints, bearing leaves with split sheaths.

TRIBE.

1*st.* PANICEÆ.—Inflorescence panicled or racemed, close. *Spikelets* dorsally compressed. *Glumes* two, very unequal; the lowermost very small. *Spikelets* with an involucre of long bristles. *Ligules* very short or wanting. *Styles* long. *Stigmas* short. Two genera, *Echinochloa*, *Setaria.*

2*d.* CHLORIDEÆ.—Inflorescence spiked or shortly racemed. *Spikelets* arranged on one side only of the rachis; each spikelet of one floret, rarely two. *Glumes* two. *Florets* not awned. Four genera, *Digitaria*, *Cynodon*, *Knappia*, *Spartina.*

3*d.* ALOPECUROIDEÆ.—Inflorescence close, dense. *Spikelets* of one floret. *Glumes* equal, frequently awned. Base of floret naked, not hairy. *Styles* long. *Stigmas* long. Three genera, *Alopecurus, Phleum, Polypogon.*

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* Stem solid in *Ammophila arundinacea*, the only British exception. In *Molinia cœrulea* and *Bromus patulus* the stems are nearly solid.

4*th.* PHALARIDEÆ.—Inflorescence panicled, close, or spreading. *Spikelets* of one floret. *Floret* awnless (or tipped with a minute point), with hairs or scales at the base. *Paleæ* of equal length or nearly so *Glumes* equal. Two genera, *Phalaris, Ammophila.*

5*th.* AGROSTIDEÆ.—Inflorescence panicled, close, or spreading. *Spikelets* of one floret. *Floret* more or less hairy at the base, awned; (when the awn or hairs are wanting, the paleæ are very unequal, and the lowermost glume the larger). Four genera, *Agrostis, Anemagrostis*, *Calamagrostis*, *Gastridium.*

6*th.* STIPACEÆ.—Spikelets of one floret. *Floret* strongly awned. *Glumes* long, hairy, taper-pointed. Two genera, *Stipa, Lagurus.*

7*th.* MILIACEÆ.—Inflorescence compound-panicled, spreading. *Spikelets* dorsally compressed, of one floret. *Floret* not awned, naked at the base. *Glumes* equal. One genus, *Milium.*

8*th.* ARUNDINACEÆ. — Inflorescence compound-panicled, spreading. *Spikelets* of three to five florets. *Florets* acute, not awned, very hairy at the base. *Glumes* very unequal, much shorter than the florets. One genus, *Arundo.*

9*th.* SESLERIACEÆ.—Inflorescence in the form of a short oval compact head. *Spikelets* of two to three florets. *Florets* toothed at the summit and minutely awned, longer than the glumes, naked at the base. *Styles* very short. *Stigmas* very long. One genus, *Sesleria.*

10*th.* ANTHOXANTHACEÆ.—Inflorescence panicled, close. *Spikelets* of one floret. *Floret* hairy, with both paleæ awned. *Glumes* very unequal. *Styles* very short. *Stigmas* very long. One genus, *Anthoxanthum.*

11*th.* POACEÆ.—Inflorescence panieled or racemed. *Spikelets* of two to eighteen florets. *Florets* mostly membranous at the summit, occasionally pointed, but not awned. Eight genera, *Poa, Hierochloa, Triodia, Briza, Melica, Catabrosa, Molinia, Airochloa.*

12*th.* AVENACEÆ.—Inflorescence panicled or racemed. *Spikelets* of two to four florets. *Florets* awned from the base or centre; (occasionally the lowermost floret is awnless, in that case the second floret is awned a little beneath the summit.) Five genera, *Avena, Trisetum, Arrhenatherum, Holcus, Aira.*

13*th.* FESTUCACEÆ.—Inflorescence panicled or racemed. *Spikelets* of two to fourteen florets. *Florets* awned from the summit or a little beneath it; (when the awn is wanting, the spikelets have more than six florets. *Glumes* very unequal, and the ligule short and truncated.) Five genera, *Festuca*, *Bucetum*, *Bromus*, *Dactylis*, *Cynosurus.*

14*th.* HORDEACEÆ.—Inflorescence spiked or shortly racemed. *Spikelets* arranged on both sides of the rachis, composed of one to eighteen florets. *Florets* awned from the summit or a little beneath it, occasionally the awn is wanting. Four genera, *Hordeum*, *Elymus*, *Triticum*, *Lolium.*

15*th.* NARDOIDEÆ.—Inflorescence spiked. *Spikelets* of one floret, rarely two, enclosed within the glumes. Sometimes the glumes are entirely wanting. Two genera, *Nardus*, *Rottbollia.*

GENERA.

ECHINOCHLOA.—Spikelets with an involucre of smooth bristles. Large glume hairy. Neutral floret of two paleæ, the outer palea awned. One species, *E. Crus-galli.*

SETARIA.—Spikelets with an involucre of rough bristles. Glumes not hairy. Neutral floret of one palea, not awned. Two species, *S. viridis, S. verticillata.*

DIGITARIA.—Spikelets in pairs with distinct footstalks arranged on one side of a flattened rachis. Ligules prominent, entire. Styles long, distinct. Stigmas short. Anthers cloven at each end. Two species, *D. sanguinalis, D. humifusa.*

CYNODON.—Spikelets single, with short footstalks arranged on one side of the rachis. Glumes nearly equal. Ligules wanting. Floret rather longer than the glumes. Styles distinct, prominent. One species, *C. dactylon.*

KNAPPIA.—Spikelets single, with short footstalks arranged on one side of the rachis. Glumes equal. Ligules prominent. Floret of one palea, shorter than the glumes. Styles very short. Stigmas slender and very long. Anthers cloven at each end. One species, *K. agrostidea.*

SPARTINA.—Spikelets sessile, arranged on one side of the rachis. Glumes very unequal. Ligules very short. Styles long, partly united. Anthers cloven below, entire above. Two species, *S. stricta*, *S. alterniflora.*

ALOPECURUS.—Glumes not awned. Floret of only one palea, with a long awn arising from below the centre. Six species, *A. agrestis*, *A. pratensis*, *A. alpinus*, *A. geniculatus*, *A. fulvus*, *A. bulbosus.*

PHLEUM.—Floret of two paleæ not awned, the outer palea occasionally with a minute point from the summit. Stigmas long and slender. Six species, *P. pratense, P. alpinum, P. Michelii, P. arenarium, P. asperum, P. Boehmeri.*

POLYPOGON.—Glumes with long slender awns. Floret half the length of the glumes. Outer palea without lateral ribs, tipped with a prominent awn. Stigmas bushy. Two species, *P. monspeliensis, P. littoralis.*

PHALARIS.—Outer palea without lateral ribs. Leaves broad, flat. Two species, *P. canariensis, P. arundinacea.*

AMMOPHILA.—Outer palea five-ribbed. Leaves narrow, involute. Glumes narrow, pointed, without lateral ribs. One species, *A. arundinacea.*

AGROSTIS.—Glumes nearly equal. Lowermost glume the larger. Floret much shorter than the glumes, of two very unequal paleæ. Sometimes the inner palea is wanting. Base of the floret occasionally with a minute tuft of hairs. Four species, *A. vulgaris, A. alba, A. canina, A. setacea.*

ANEMAGROSTIS.—Glumes unequal. Lowermost glume the smaller. Floret as long as the glumes. Outer palea with a long awn more than three times the length of the palea.

CALAMAGROSTIS.—Glumes nearly equal. Florets of two very unequal paleæ. Outer palea awned, furnished at the base with long hairs, more than half the length of the floret, sometimes longer than the floret. Four species, *C. stricta, C. Epigejos, C. lanceolata, C. Lapponica.*

GASTRIDIUM. Glumes nearly equal, ventricose at the base. Floret not half the length of the glumes. Outer palea with an awn more than twice its length. One species, *G. lendigerum.*

STIPA.—Floret with a feathery awn, more than five times its length. Leaves setaceous. One species, *S. pennata.*

LAGURUS.—Floret with a bristly awn. Leaves broad and downy. One species, *L. ovatus.*

MILIUM.—Leaves broad. Ligules prominent. Glumes three-ribbed. One species, *M. effusum.*

ARUNDO.—Leaves broad. Ligules wanting. Outer palea acute. Inner palea very short. One species, *A. Phragmites.*

SESLERIA.—Glumes about equal, without lateral ribs. Uppermost leaf very short. One species, *S. cœrulea.*

ANTHOXANTHUM.—Large glume three-ribbed. Ligules long and pointed. One species, *A. odoratum.*

POA.—Glumes three-ribbed. Florets generally webbed. Outer palea three or five-ribbed, the dorsal and marginal ribs mostly hairy;—or Glumes without lateral ribs. Outer palea three, five, or seven-ribbed; (when three-ribbed the lowermost floret is much longer than the glumes, with the dorsal rib minutely toothed its whole length.) Twenty-two species, *P. pratensis, P. trivialis, P. bulbosa, P. compressa, P. subcompressa, P. polynoda, P. Parnellii, P. nemoralis, P. montana, P. alpina, P. laxa, P. cæsia, P. annua, P. distans, P. maritima, P. Borreri, P. procumbens, P. rigida, P. loliacea, P. aquatica, P. fluitans, P. sylvatica.*

HIEROCHLOA.—Glumes broad, nearly equal, without lateral ribs, with not more than three florets, all inclosed within the glumes. Outer palea hairy, five-ribbed. Anthers two in the perfect floret. One species, *H. borealis.*

TRIODIA.—Florets inclosed within the glumes. Glumes three-ribbed. Ligules wanting. One species, *T. decumbens.*

BRIZA.—Glumes nearly equal, spreading, three-ribbed. Florets from five to eight in each spikelet. Outer palea broad, without lateral ribs, the back gibbous. Two species, *B. minor, B. media.*

MELICA.—Florets inclosed within the glumes. Glumes five-ribbed. Outer palea seven-ribbed. Two species, *M. nutans*, *M. uniflora.*

CATABROSA.—Spikelets of one or two florets, much longer than the glumes. Outer palea notched at the summit, three-ribbed. Glumes very unequal, small, without lateral ribs. Ligules prominent. One species, *C. aquatica.*

MOLINIA.—Spikelets of one or two florets, much longer than the glumes. Outer palea acute, entire at the summit, three-ribbed. Glumes without lateral ribs. Ligules very small. Leaves hairy on the inner surface. Two species, *M. depauperata*, *M. cœrulea.*

AIROCHLOA.—Spikelets of two florets inclosed within the glumes. Glumes equal. Outer palea three-ribbed. One species, *A. cristata.*

AVENA.—Glumes more than five-ribbed. Florets awned from below the centre. Two species, *A. strigosa*, *A. fatua.*

TRISETUM.—Spikelets of three or more florets. Large glume three-ribbed. Outer palea five-ribbed, with a long awn arising from about the centre. Florets hairy at the base. Three species, *T. pratense*, *T. pubescens*, *T. flavescence.*

ARRHENATHERUM.—Glumes very unequal. Large glume three-ribbed. Outer palea seven-ribbed. Florets hairy at the base. Lowermost floret awned from near the base. Uppermost floret awned from a little beneath the summit. One species, *A. avenaceum.*

HOLCUS.—Glumes nearly of equal lengths. Large glume three-ribbed. Florets inclosed within the glumes. Lowermost floret with a long footstalk, about half the length of the floret. Two species, *H. lanatus*, *H. mollis.*

AIRA.—Spikelets of two florets. Glumes nearly of equal lengths. Lowermost floret sessile. Outer palea with very indistinct ribs or altogether wanting. Six species, *A. cæspitosa*, *A. flexuosa*, *A. alpina*, *A. caryophyllea*, *A. præcox*, *A. canescens*.

FESTUCA.—Florets awned from the very summit. Leaves of the root very narrow. Four species, *F. bromoides*, *F. uniglumis*, *F. duriuscula*, *F. ovina*.

BUCETUM.—Florets membranous at the summit. Awn when present arising from beneath the summit. Leaves of the root broad and flat. Ligule of upper sheath very small. Four species, *B. loliaceum*, *B. pratense*, *B. elatius*, *B. giganteum*.

BROMUS.—Florets awned from a little beneath the summit. Ligule of upper sheath prominent. Styles arising, generally, from below the summit of the ovarium. Spikelets of not less than five florets. Twelve species, *B. maximus*, *B. mollis*, *B. racemosus*, *B. secalinus*, *B. commutatus*, *B. arvensis*, *B. patulus*, *B. squarrosus*, *B. sterilis*, *B. diandrus*, *B. erectus*, *B. asper*.

DACTYLIS.—Panicle tufted. Spikelets of not more than four florets. Florets with a minute awn from a little below the summit. One species, *D. glomerata*.

CYNOSURUS.—Spikelets with a pectinated involucre. Florets tipped with a rough awn. Two species, *C. cristatus*, *C. echinatus*.

HORDEUM.—Spikelets arranged in threes on each tooth of the rachis. Glumes terminating in bristly awns. Four species, *H. murinum*, *H. pratense*, *H. maritimum*, *H. sylvaticum*.

ELYMUS.—Spikelets arranged in pairs on each side of the rachis. Glumes two, situated parallel to each other. Two species, *E. arenarius*, *E. geniculatus*.

TRITICUM.—Spikelets arranged singly on each side of the rachis. Glumes two, situated opposite to each other. Six species, *T. repens, T. caninum, T. junceum, T. cristatum, T. sylvaticum, T. pinnatum.*

LOLIUM.—Spikelets arranged singly on each side of the rachis, with one glume, rarely two; when the second glume is present the outer glume is as long as the spikelet. Two species, *L. perenne, L. temulentum.*

NARDUS.—Spikelets arranged on one side of the rachis. Glumes wanting. One species, *N. stricta.*

ROTTBOLLIA.—Spikelets arranged on both sides of the rachis. Glumes two. One species, *R. incurvata.*

PART II.

GRASSES OF BRITAIN.

ECHINOCHLOA CRUS-GALLI.

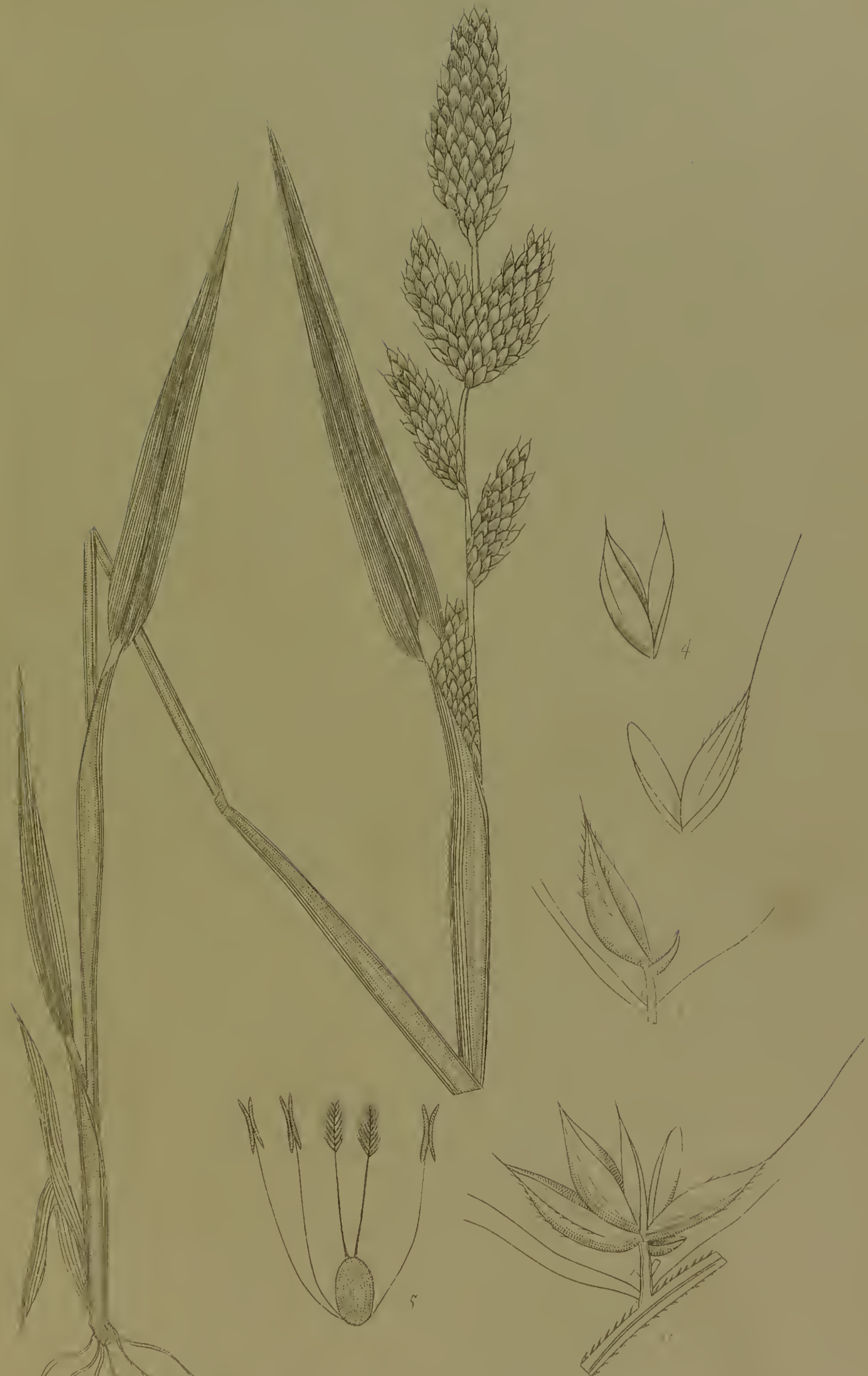
Loose Panick-Grass.

Plate LXVII.

Specific Character.—Sheaths smooth.

Description.—Root annual, fibrous, producing several stems from one to two feet in length. *Stems* erect, smooth, hollow, and striated, bearing three or four leaves with smooth, striated sheaths; the upper sheath situated generally close under the panicle, inflated and about equal in length to its leaf. *Ligule* wanting, a whitish conical mark in place of it. *Joints* usually three, the upper situated above the middle of the stem, and mostly but not invariably covered by the second sheath. *Leaves* broad, pointed, frequently rough on the inner surface, smooth behind, the margins whitish and strongly toothed; the central rib very conspicuous, especially on the lower half. *Inflorescence* compound panicled, close, secund, the branches rough, rachis angular. *Spikelets* nearly sessile, arranged in clusters, mostly of threes, and at the base of each arise two or three long, white, smooth hairs or bristles; each spikelet composed of two glumes and two florets, one of the florets neutral. *Glumes* very unequal, the outer much the smaller, not one-fifth the size of the inner glume; inner glume three-ribbed, furnished with bristles, terminating in an awn very various in length. *Lowermost* floret barren, of two flattish paleæ, the outer three-ribbed, covered with bristles and tipped with a rough awn, which is frequently abortive; inner palea about the length of the outer, very thin and transparent, placed close to the back of the inner palea of the second floret. Second or upper floret fertile, of two paleæ, the outer smooth, polished, tipped with a little point, which is occasionally downy; inner palea flattish, equal in length to the outer, folded at the margins and terminating in a small roughish point. *Styles* two, long and smooth, arising from the summit of the ovarium. *Stigmas* short and feathery. *Filaments* three, slender. *Anthers* short, cloven at each extremity.

Echinochloa Crus-galli, Beauv., Babington. *Panicum Crus-galli,* Linn., Smith, Hooker, Lindley, Koch. *Oplismenus Crus-galli,* Kunth.



Echinochloa Crus-galli

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Obs.—This species is readily distinguished from every other British grass, by the sheaths having no ligules, and the spikelets having long smooth hairs or bristles at their base. (See Fig. 2.)

This is a strong coarse grass, found in moist arable land, but of no agricultural use. It is very rarely met with in Britain, having been gathered only in a few instances in the counties of Hants and Surrey; and although it has been placed among our British plants I do not consider it as indigenous to this country. It is a native of Norway, Sweden, France, Belgium, Holland, Germany, Switzerland, Italy, North Africa, and the United States.

Flowers in August, and ripens its seed in the end of September.

The accompanying figure was taken from a specimen gathered in Surrey.

Explanation of Plate LXVII. *Echinochloa Crus-galli*, natural size.

Fig. 1. Spikelet expanded showing the two glumes and two florets with three long hairs at the base.
2. Two very unequal glumes with three long hairs at the base.
3. Lowermost floret showing the two paleæ, the outer with a long awn.
4. Upper floret showing both paleæ pointed or shortly awned.
5. Ovarium, pistils, and stamens.

} Magnified.

SETARIA VIRIDIS.

Erect Bristle-Grass.

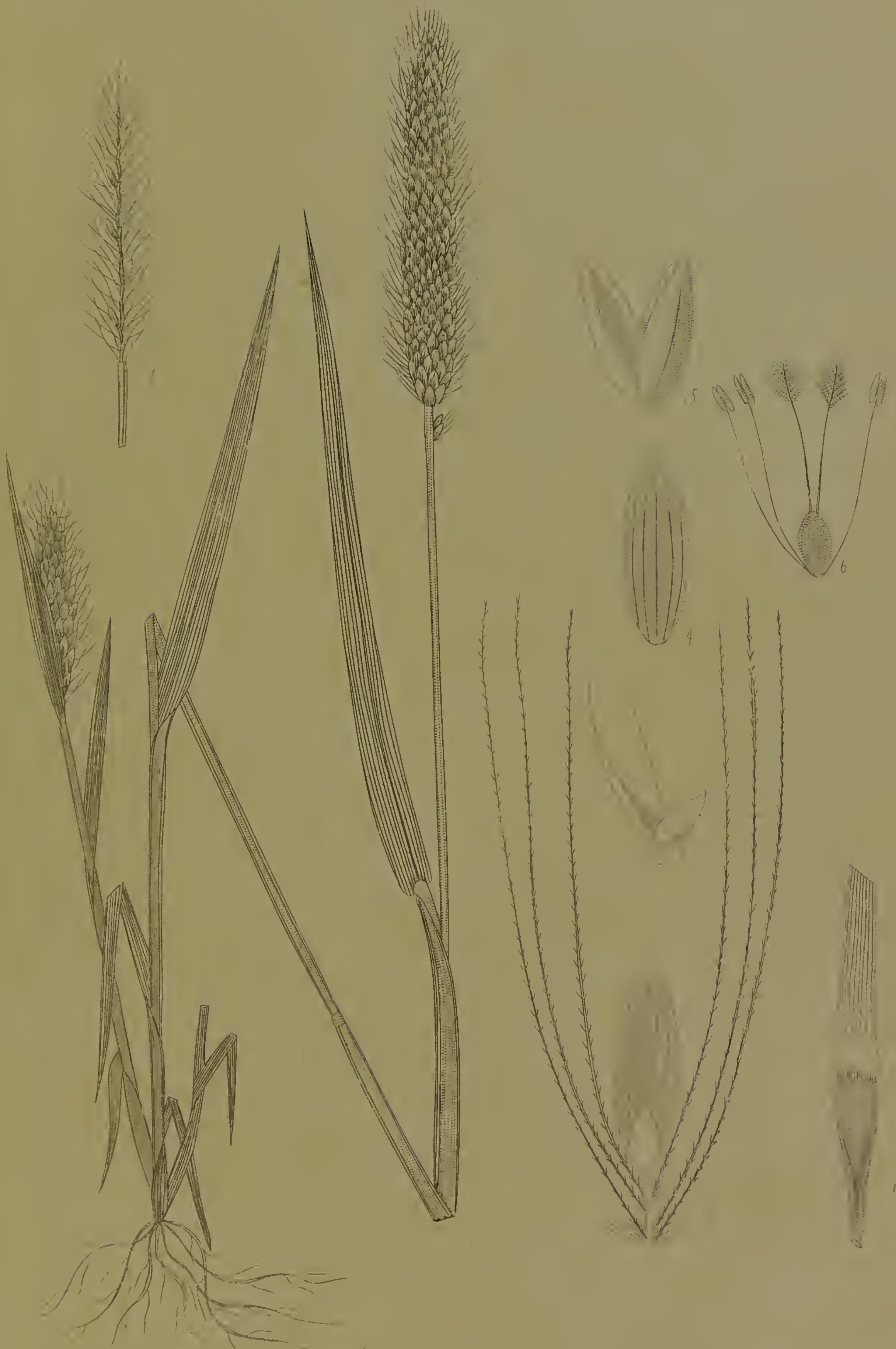
Plate LXVIII.

Specific Character.—Involucral bristles with erect teeth.

Description.—Root annual, fibrous, producing stems from three to eighteen inches in length. *Stems* erect, hollow, mostly branched below, rough above, bearing four or five leaves with smooth striated sheaths, the upper sheath shorter than its leaf. *Ligule* of upper sheath short, blunt, fringed, the length about equal to one-third of the breadth. *Joints* usually four, the upper situated rather below the centre of the stem, and frequently covered by the second sheath. *Leaves* flat, lanceolate, rough, especially on the margins. *Inflorescence* simple panicled, the branches very short, the rachis hairy. *Spikelets* dorsally compressed, crowded on all sides, nearly sessile, arranged in clusters, furnished at the base with long, rough, involucral bristles more than twice the length of the spikelet; each bristle strongly toothed, the teeth pointing upwards. Each spikelet composed of two glumes and two florets, and although usually green has occasionally a purple tinge. *Glumes* two, very unequal, the lowermost considerably the smaller, broad and pointed, the upper glume of an oblong form, smooth, five-ribbed. Lowermost floret barren, of one palea, very similar in size and appearance to the larger glume, and by some authors has been considered as a third glume. Upper floret of two paleæ, the outer the larger, concave, three-ribbed, the surface minutely dotted in longitudinal lines; the inner palea flattish, folded, and also minutely dotted. *Styles* two, distinct, long, and smooth, arising from the summit of the ovarium. *Stigmas* short and feathery. *Stamens* three. *Anthers* dark purple. *Seeds* hard and polished.

Obs.—*Setaria viridis* is easily distinguished from *Setaria verticillata*, in the *involucral* bristles being about three times the length of the spikelet, and furnished with minute teeth directed upwards, (see Fig. 2);—while in *Setaria verticillata* the *involucral* bristles are not

Setaria viridis, Beauv., Koch, Hooker, Lind., Bab., Kunth. *Panicum viride*, Linn., Smith, Knapp, Schrad., Leers.



Setaria viridis.

R. Parnell M.D. del^t et sculp^t

Printed by [illegible]

Published by W^m Blackwood & Sons. Edinburgh & London

twice the length of the spikelet, and furnished with teeth directed downwards.

This grass is not strictly a British plant, although found occasionally in Surrey, Suffolk, and Norfolk. It is a native of Norway, Sweden, France, Prussia, Austria, Switzerland, Italy, Portugal, Spain, Russia, North Africa, and the United States. It grows naturally on sandy soil in cultivated districts, but of no agricultural importance. In some countries it becomes a very troublesome weed. It produces an abundance of seed, of which small birds are very fond.

Flowers in July and August, and ripens its seed in about the end of September.

The accompanying figure was taken from a specimen gathered in Suffolk.

Explanation of Plate LXVIII. *Setaria viridis,* natural size.

Fig. 1. Rachis, with the spikelets removed, leaving the rough bristles natural size.
2. Spikelets showing the long bristles with erect teeth.
3. Glumes very unequal.
4. Lowermost floret of one palea.
5. Upper floret of two paleæ.
6. Ovarium, pistils, and stamens.
7. Ligule of upper sheath.

Magnified.

SETARIA VERTICILLATA.

Reflex Bristle-Grass.

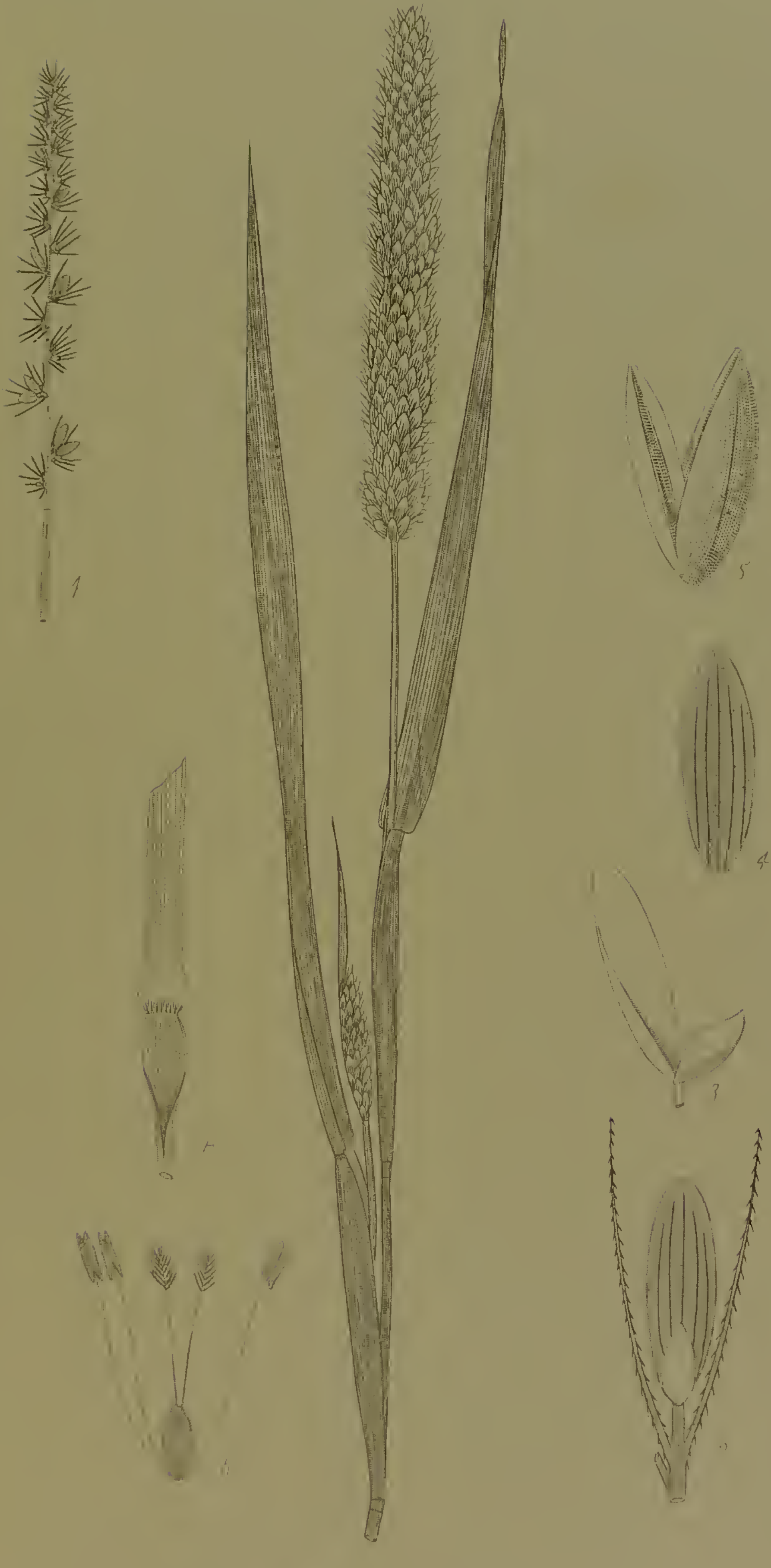
Plate LXIX.

Specific Character.—Involucral bristles, with reflexed teeth.

Description.—Root annual, fibrous, producing many stems from six inches to two feet in length. *Stems* erect, hollow, mostly branched below, rough above, bearing four or five leaves with smooth, striated, sheaths; the upper sheath shorter than its leaf. *Ligule* of upper sheath, short, blunt, fringed, the length about equal to one-third of its breadth. *Joints* usually four, the upper situated generally above the centre of the stem, and mostly covered by the second sheath. *Leaves* flat, lanceolate, rough, especially on the margins. *Inflorescence* simple panicled, the branches very short, the rachis rough. *Spikelets* dorsally compressed, crowded on all sides, nearly sessile, arranged in clusters, furnished at the base with stout, rough, involucral bristles rather longer than the spikelets; each bristle strongly toothed, the teeth pointing downwards. Each spikelet composed of two glumes and two florets, having a purplish tinge. *Glumes*, two very unequal, the lowermost considerably the smaller, broad and pointed, the upper glume of an oblong form, smooth, five-ribbed. Lowermost floret barren, of one palea, very similar in size and appearance to the large glume, and by some authors has been considered as a third glume. Upper floret of two paleæ, the outer the larger, concave, three-ribbed, the surface minutely dotted in longitudinal lines; the inner palea flattish, folded, and also minutely dotted. *Styles* two, distinct, long and smooth, arising from the summit of the ovarium. *Stigmas* short and feathery. *Stamens* three. *Anthers* dark-purple. *Seeds* hard and polished.

Obs.—*Setaria verticillata* is distinguished from *Setaria viridis* in the *involucral* bristles, not being twice the length of the spikelet, and furnished with teeth directed downwards, (see Fig. 2.);—whereas in

Setaria verticillata, Beauv., Koch, Hooker, Lind., Bab., Kunth. *Panicum verticillatum*, Linn., Smith, Knapp. *Penniselum verticillatum*, Brown.



Setaria verticillata

R. Parnell M.D. delt et sculpt

Printed by J. Gellatly

Published by Wm Blackwood & Sons Edinburgh & London.

Setaria viridis the *involucral* bristles are about three times the length of the spikelet, with the teeth directed upwards.

It is probable that this grass was introduced into Britain through human agency, and therefore cannot be considered as a true native. It is met with occasionally in Middlesex and Norfolk in cultivated fields. It is a native of France, Holland, Belgium, Germany, Switzerland, Italy, North Africa, Asia, and the United States. Of no agricultural use.

Flowers in July and August, and ripens its seed in about the end of September.

The accompanying figure was taken from a specimen gathered in Norfolk.

Explanation of Plate LXIX. *Setaria verticillata*, natural size.

Fig. 1. Rachis with the spikelets removed, leaving the rough bristles. Natural size.
2. Spikelet showing the stout bristles with reflexed teeth.
3. Glumes very unequal.
4. Lowermost floret of one palea.
5. Upper floret of two paleæ.
6. Ovarium, pistils, and stamens.
7. Ligule of upper sheath.

Magnified.

DIGITARIA SANGUINALIS.

Hairy Finger-Grass.

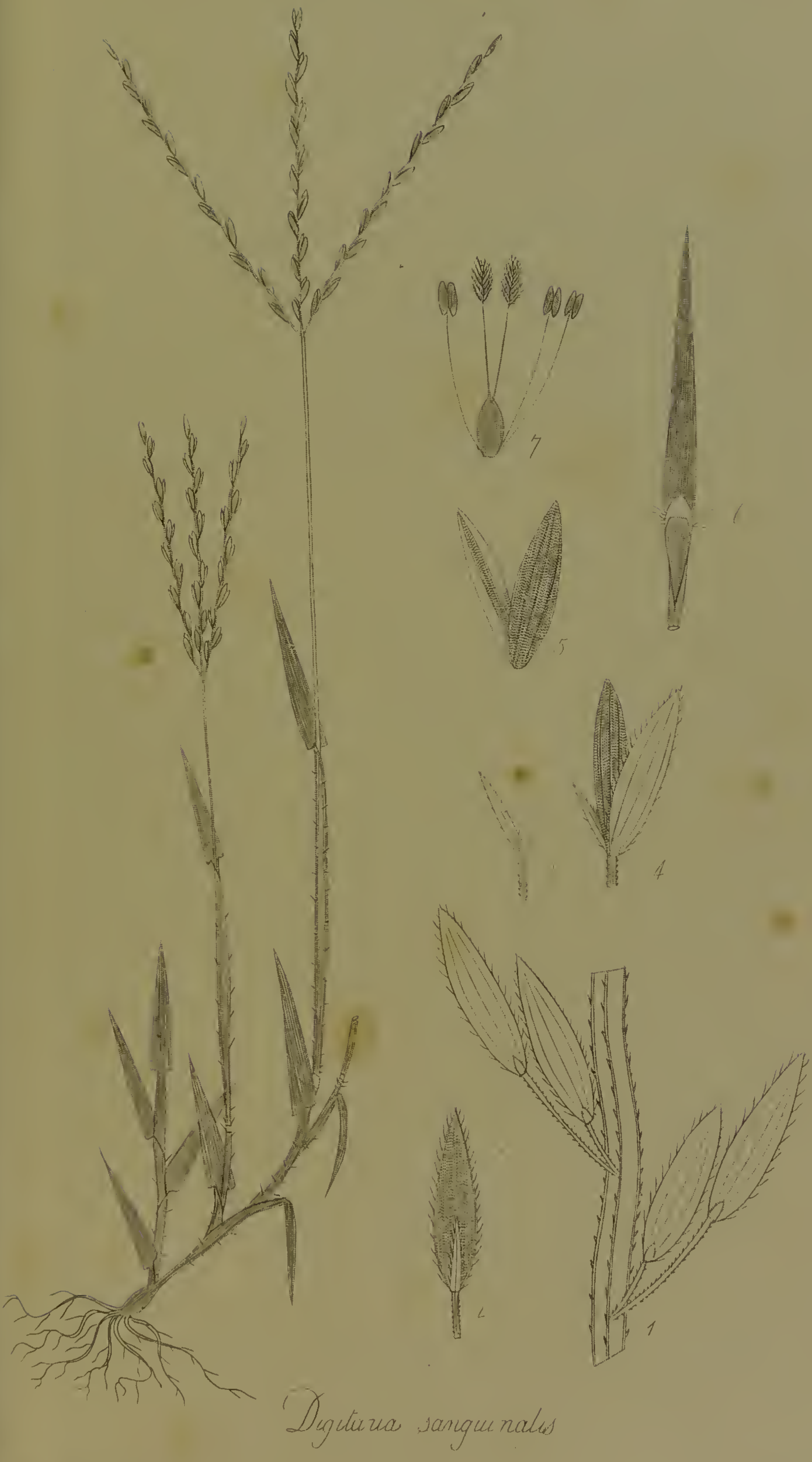
Plate LXX.

Specific Character.—Ribs of lowermost floret smooth. Glumes very unequal.

Description.—Root annual, fibrous, producing several stems from six to eighteen inches in length. *Stems* branched and decumbent at the base, then ascending, smooth, hollow, striated, polished, bearing usually four leaves, with more or less hairy sheaths; the upper sheath much longer than its leaf. *Ligule* of upper sheath prominent, rounded, and hairy at the base. *Joints* usually three, situated near the base, and mostly covered by the sheaths. *Leaves* short, flat, rather broad, generally rough on both surfaces, with rough, white margins. The hairs, which are more distinct on the lower sheaths, especially near the joints, spring from small tubercles. *Inflorescence* digitate, the branches long, erect, and linear, from three to nine in number. *Rachis* flattish, and somewhat angular, with the margins minutely toothed, bearing unilateral spikelets arranged in pairs on footstalks of unequal lengths, the one having the long footstalk being fertile, while the other is barren. *Spikelets* dorsally compressed, of an oblong-lanceolate form, composed of two glumes and two florets. *Glumes* two of very unequal size, the lowermost very small, resembling a membranous scale; the upper glume, acute, downy, three-ribbed. Lowermost floret of one palea, flat, of an oblong-lanceolate form, with five smooth ribs, and the margins very pubescent. Upper floret of two paleæ of equal length, frequently tinged with purple on one side only; outer palea obscurely three-ribbed, granulated in longitudinal lines, the margins neither hairy or scabrous; inner palea with folded margins not fringed. *Filaments* three, rather longer than the paleæ. *Anthers* short, violet-coloured, cloven at each extremity. *Styles* two, slender, about the length of the stamens. *Stigmas* purplish, short, feathery. *Seed* hard and polished.

Digitaria sanguinalis, Scopoli, Smith, Hooker, Bab., Lind. *Panicum sanguinale*, Linn., Koch, Kunth, Engl. Bot., Knapp, Curtis, Schreb., With. *Syntherisma vulgare*, Schrad.

PLATE LXX.



Digitaria sanguinalis

Parnell M.D. del^t et sculp^t

Printed by Gellatly.

Published by W^m Blackwood & Sons. Edinburgh & London.

Obs.—*Digitaria sanguinalis* is distinguished from *Digitaria humifusa* in the *glumes* being very unequal, containing two florets, (see Fig. 4),—while in *Digitaria humifusa* the *glumes* are of equal size, and contain but one floret.

Digitaria sanguinalis seems to vary exceedingly in the hairiness of its leaves and sheaths, so much so, that on some occasions they are perfectly hispid, while on others they are almost destitute of hairs; examples of the former variety I have gathered in the West Indies; at New Orleans; on the banks of the Mississippi and the Ohio. The latter variety I have found in Germany, more especially at Baden Baden, in the neighbourhood of the hot springs, also on the banks of the Danube near Lintz.

This grass is of no agricultural use, but rather a troublesome weed, especially in those countries where it is a native. It grows best on rich sandy soil, and although an annual, spreads rapidly in a short time. Mr Sinclair states that in some parts of Germany this grass is cultivated for its seed, which, when boiled with milk or wine, is said to form an extremely palatable food, and is generally made use of whole in the manner of sago, to which it is in most instances preferred. It produces much seed, of which birds are very fond, and requires to be protected by nets or otherwise during the time of ripening. The usual method of collecting and preparing the seeds is, that at sunrise they are gathered or beaten into a hair-sieve from the dewy grass, spread on a sheet and dried for a fortnight in the sun; they are then gently beaten with a wooden pestle in a wooden trough or mortar, with straw laid between the seeds and the pestle, till the chaff comes of; they are then winnowed. After this they are again put into the trough in rows, with dried marigold flowers, apple and hazel-leaves, and pounded until they appear bright; they are then winnowed again, and being made perfectly clean by this last process, are fit for use. The marigold leaves are added to give the seeds a finer colour. A bushel of seed with the chaff yields only about two quarts of clean seed.

Digitaria sanguinalis is not an indigenous plant. It has been found occasionally in England, but in no fixed station. It formerly grew in Battersea fields near London, and according to Mr Borrer's opinion, the other habitats, given in the British Floras for this plant, belong to the next species.

It is a native of France, Germany, Switzerland, Italy, North Africa, America, and the West Indies.

Flowers in August, and ripens its seed in about the end of September.

The accompanying figure was taken from a specimen gathered in Yorkshire.

Explanation of Plate LXX. *Digitaria sanguinalis*, natural size.

Fig. 1. Spikelets and rachis.
2. Spikelet showing the upper glume.
3. Two glumes very unequal.
4. Two glumes and two florets.
5. Uppermost floret showing the outer and inner paleæ.
6. Ligule of upper sheath showing the hairs at the base.
7. Ovarium, pistils, and stamens.

Magnified.

DIGITARIA HUMIFUSA.

Glabrous Finger-Grass.

Plate LXXI.

Specific Characters.—Glumes equal. Sheaths smooth.

Description.—Root annual, fibrous, producing several stems from four to nine inches in length. *Stems* branched and decumbent at the base, then ascending, smooth, striated, hollow, polished, bearing usually four leaves with smooth striated sheaths, the upper sheath much longer than its leaf. *Ligule* of upper sheath obtuse, occasionally furnished with hairs at its base. *Joints* about three, situate near the base, and mostly covered by the sheaths. *Leaves* short, flat, rather broad, not hairy, the margins rough. *Inflorescence* digitate, the branches long and linear, from two to four in number. *Rachis* flattish and somewhat angular, with the margins minutely toothed, bearing unilateral spikelets arranged in pairs or threes on footstalks of unequal lengths. *Spikelets* dorsally compressed of an oval form, composed of two glumes and one floret. *Glumes* of equal size, pubescent, five-ribbed, the inner glume of a deep purple, the outer but slightly tinged. *Floret* equal in length to the glumes, of a deep reddish purple, of two nearly equal paleæ, minutely striated and glossy, becoming of a horny texture as the seed ripens; inner palea folded and entire at the margins. *Filaments* three, rather longer than the paleæ. *Anthers* short, violet-coloured, cloven at each extremity. *Styles* two, slender, about the length of the stamens. *Stimgas* purplish, short, feathery, dense. *Seeds* hard and polished.

Obs.—*Digitaria humifusa* is distinguished from *Digitaria sanguinalis* in the *glumes* being of equal size, and containing but one floret, (see Fig. 2.);—while in *Digitaria sanguinalis* the *glumes* are very unequal, and contain two florets.

Digitaria humifusa is distinguished from *Cynodon Dactylon* in the *spikelets* being dorsally compressed, and arranged on the rachis in pairs or threes (see Fig. 1). *Glumes* oval. Ligule distinct, (Fig. 5.);—whereas in *Cynodon Dactylon* the *spikelets* are laterally compressed,

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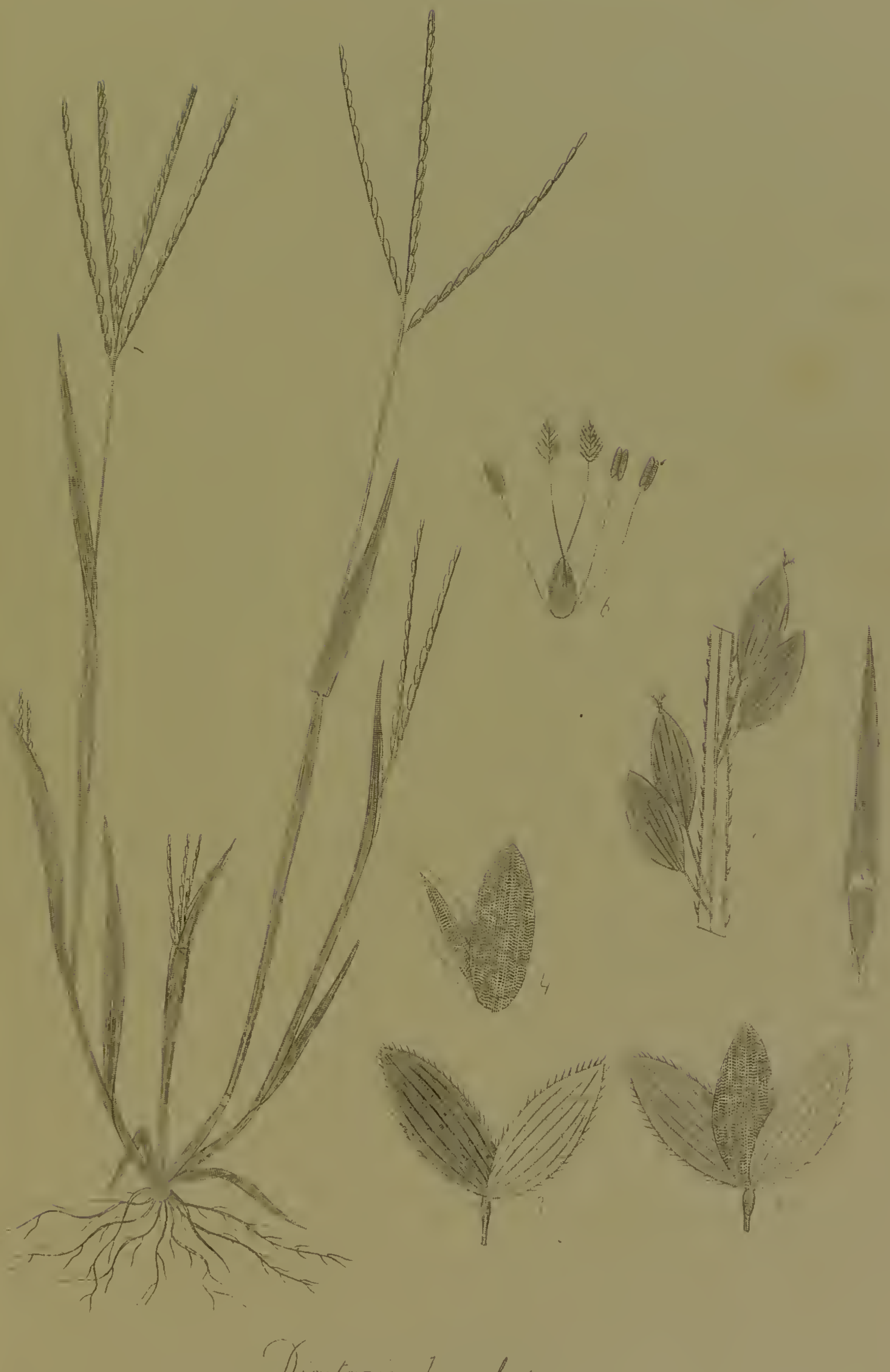
Digitaria humifusa, Pers., Hook., Bab. *Syntherisma glabrum*, Schrad. *Panicum glabrum*, Koch. *Panicum humifusum*, Kunth. *Digitaria filiformis*, Koel. *Panicum sanguinale*, Pollich.



Digitaria humifusa

P. Parnell. M.D. delt. & sculpt.

Printed by J. Gellatly

Published by Wm Blackwood & Sons. Edinburgh & London

and arranged on the rachis singly. *Glumes* acute, lanceolate. Ligule wanting.

This grass, like the *Digitaria sanguinalis,* is a very doubtful native. It grows naturally on sandy ground in cultivated places, and is occasionally found in Sussex, Surrey, Suffolk, Norfolk, and Yorkshire. It is a native of France, Holland, Belgium, Prussia, Switzerland, and Italy. Of no agricultural use.

Flowers in July and August, and ripens its seed in September.

The accompanying figure was taken from a specimen gathered in Yorkshire.

Explanation of Plate LXXI. *Digitaria humifusa,* natural size.

Fig. 1. Spikelets and rachis.
2. Two glumes and floret.
3. Two glumes.
4. Floret showing the two paleæ.
5. Ligule of upper sheath.
6. Ovarium, pistils, and stamens.

Magnified.

CYNODON DACTYLON.

Creeping Finger-Grass.

Plate LXXII.

Specific Characters.—Glumes acute, nearly equal.

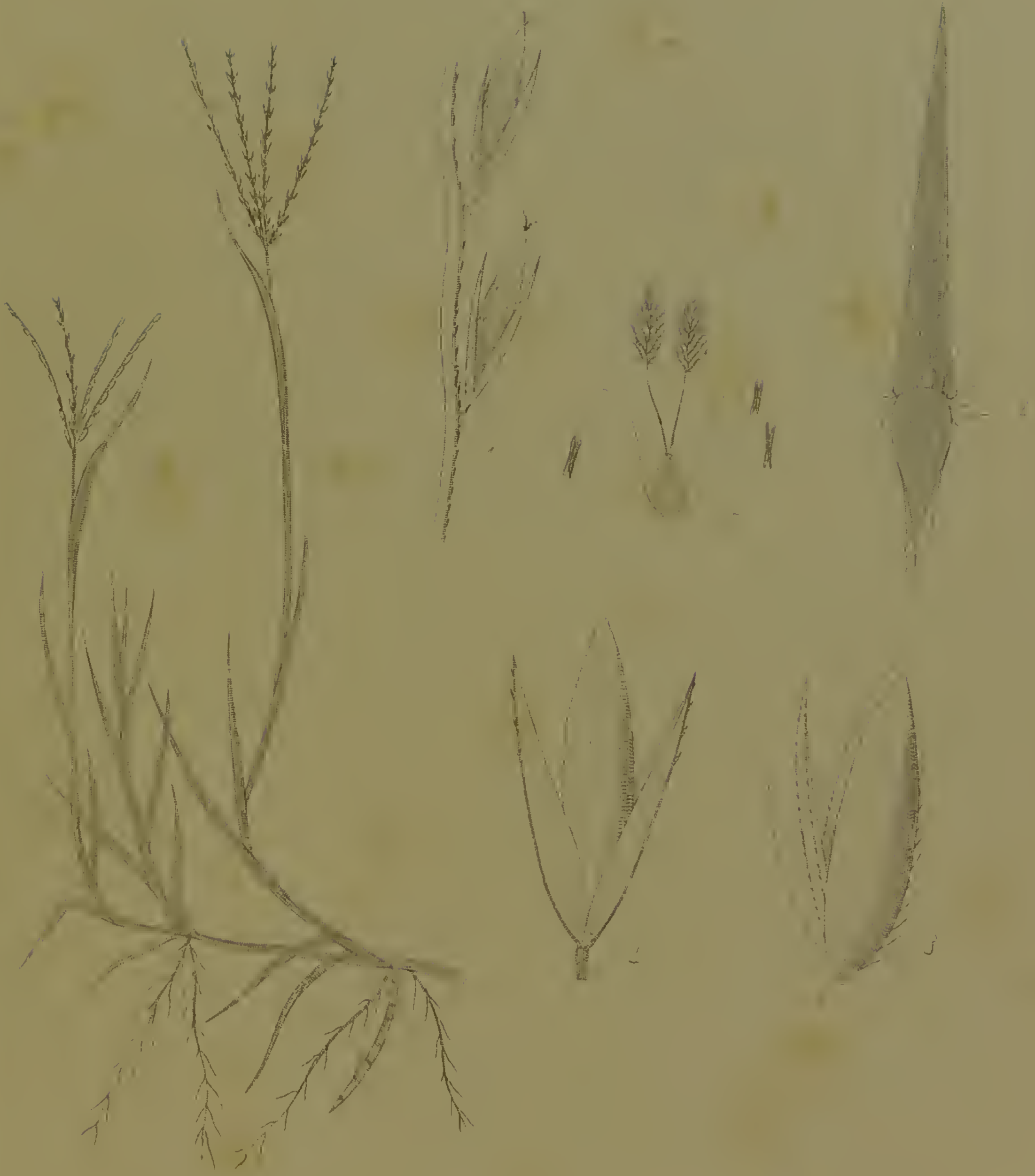
Description.—Root perennial, creeping, producing many stems from three to six inches in length. *Stems* smooth, hollow, prostrate at the base, bearing four or five leaves, with smooth, striated sheaths; the upper sheath much longer than its leaf, crowned with a tuft of hairs in place of a ligule. *Joints* near the base, covered by the sheaths. *Leaves* flat or folded, acute, rigid, hairy, rough at the edges, the upper leaf situated close under the panicle. *Infloresceence* digitate, linear, purplish, bearing about eleven nearly sessile spikelets, arranged singly at equal distances on one side only of the rachis; the rachis rough, the margins closely toothed. *Spikelets* laterally compressed, composed of two glumes and one floret, with an occasional rudiment of a second. *Glumes* acute, nearly equal, the lower rather the smaller, without lateral ribs, toothed on the upper half of the keel. *Floret* rather longer than the glumes, of two paleæ, the outer palea the larger without lateral ribs, the dorsal rib and lower half of the margins hairy; the inner palea about equal in length to the outer and rough at the margins. *Stamens* three. *Pistils* two. *Stigmas* feathery. *Styles* distinct, rather long.

Obs.—*Cynodon Dactylon* is distinguished from *Digitaria* in the *spikelets* being laterally compressed, and arising from the rachis singly (see Fig. 1.) *Ligule* wanting,—while in *Digitaria* the *spikelets* are dorsally compressed, and arise from the rachis in pairs or threes, and the *ligule* is very distinct.

This grass grows abundantly on the sandy shores in the south-west

Cynodon Dactylon, Pers., Koch, Kunth, Smith, Hooker, Bab., Lind. *Panicum Dactylon*, Linn., Eng. Bot., Knapp.

PLATE LXXII



Cynodon Dactylon

[illegible] del^t et sculp^t

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of Cornwall, but is not known to exist in any other part of Britain. It is found in Spain, Portugal, Italy, Turkey, Greece, Islands of the Mediterranean, North Africa, Western Asia, United States, and the West Indies. (I am indebted to Mrs Anderson of Montego Bay for specimens gathered in Jamaica.)

Flowers in July and August, and ripens its seed in about the end of September. Of no agricultural use.

The accompanying figure was taken from specimens gathered in Cornwall.

Explanation of Plate LXXII. *Cynodon Dactylon,* natural size.

Fig. 1. Spikelets and rachis.
2. Spikelet showing the glumes and floret.
3. Floret showing the outer and inner palea, and a rudiment of a second floret on a long footstalk.
4. Upper sheath crowned with hairs in place of a ligule.
5. Ovarium, pistils, and stamens.

Magnified.

KNAPPIA AGROSTIDEA.

Early Knappia.

Plate LXXIII.

Specific Characters.—Florets hairy, shorter than the glumes.

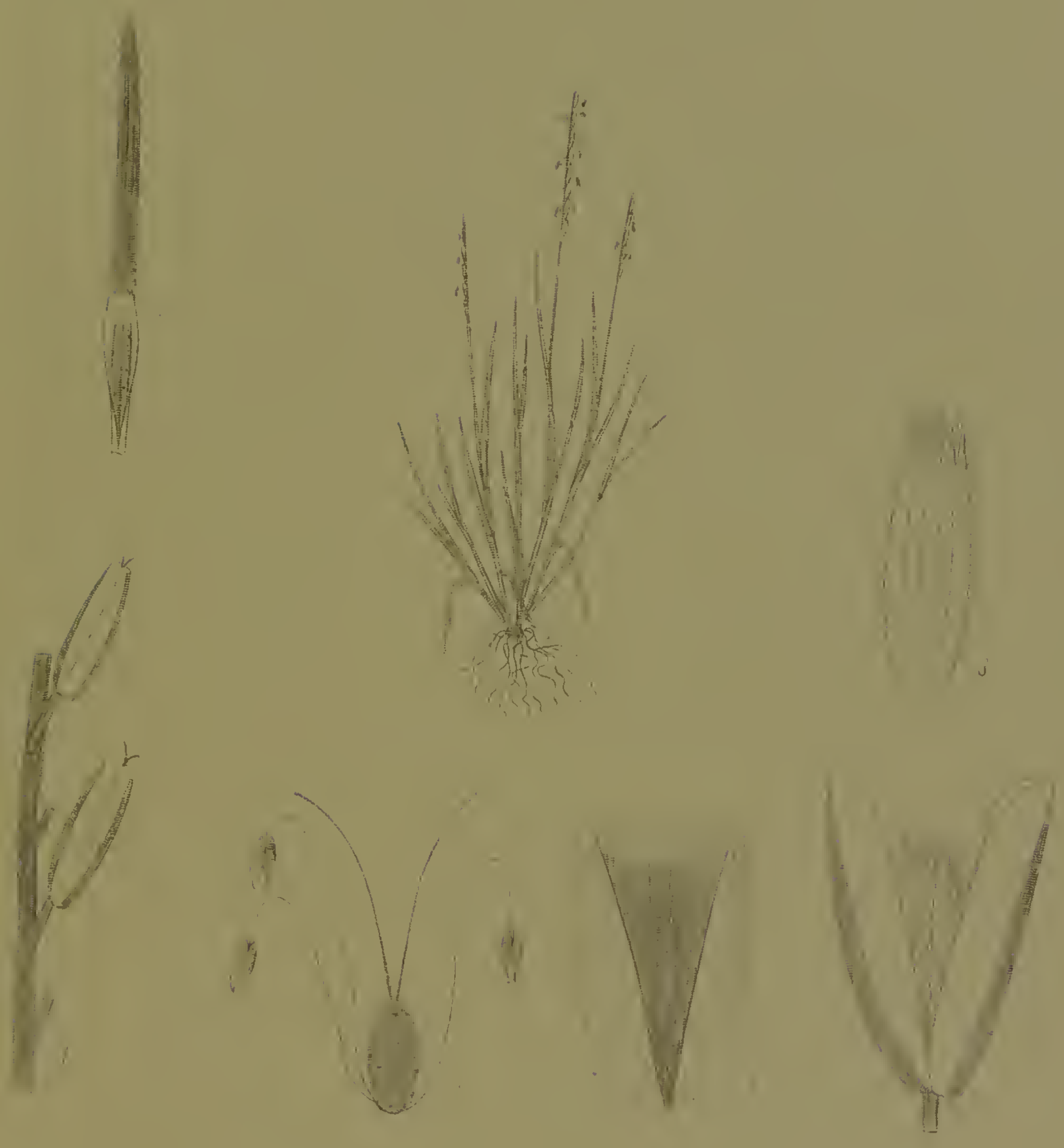
Description.—Root annual, fibrous, producing many stems, from two to four inches in length. *Stems* smooth, slender, roundish, hollow, swelling upwards, bearing two or three leaves with smooth compressed sheaths; upper sheath longer than its leaf. *Ligule* of upper sheath prominent, obtuse, crenate, embracing the stem, decurrent, the length about equal to its breadth. *Leaves* narrow, blunt, channelled, smooth. *Inflorescence* racemed, unilateral; rachis smooth. *Spikelets* on short though very distinct footstalks, composed of two glumes, and one floret. *Glumes* equal, smooth, obtuse, green down the back, the sides tinged with purple, without lateral ribs; outer glume ("gibbous at the base, especially when recent,"—Professor Graham.) *Floret* of only one palea, (two paleæ according to some authors,) shorter than the glumes, white, very hairy, obtuse, and ragged at the summit. *Styles* two, short, distinct. *Stigmas* very long, slender, and feathery. *Stamens* three. *Ovarium* beautifully reticulated, or marked in longitudinal dots.

Obs.—This grass is a native of England, France, and central parts of Europe, found growing in sandy maritime pastures. It is frequent along the south-west coast of Anglesea, and Professor Graham has found it growing in abundance at St Clements, Jersey, on a sandy common near the shore, as well as in several other places in the same island.

Flowers in March and April, and ripens its seed in about the end of May. Of no agricultural use.

The accompanying figure was taken from specimens gathered in Jersey.

Knappia agrostidea, Smith. Hooker, With.. Bab. *Agrostis minima*, Linn. *Chamagrostis minima*, Schrader, Lind. *Mibora verna*, Beauv. *Sturmia minima*, Hoppe.



Knappia agrostidea

Parnell M.D. del. et sculp.

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Explanation of Plate LXXIII. *Knappia agrostidea*, natural size.

Fig. 1. Spikelets and rachis.
2. Spikelet showing the two glumes and floret.
3. Floret of only one palea.
4. Palea opened.
5. Ligule.
6. Ovarium, pistils, and stamens.

Magnified.

SPARTINA STRICTA.

Twin-spiked Cord-Grass.

Plate LXXIV.

Specific Characters.—Glumes hairy. Outer glume more than half the length of the inner. Inner palea longer than the glumes.

Description.—Root perennial, with strong creeping fibres. *Stem* smooth, hollow, striated, sheathed to the summit, from ten to twenty inches high, bearing numerous leaves with smooth, striated sheaths; the upper sheath longer than its leaf. *Ligule* very short, obtuse, ragged, about five times as broad as long. *Joints* numerous, all covered by the sheaths. *Leaves* mostly involute, smooth, pointed, and rigid, easily separate from their sheaths. *Inflorescence* of two or three spikes, rarely of only one; the rachis angular, smooth, bearing usually about eight or nine sessile spikelets, arranged alternately on one side of the rachis. *Spikelets* laterally compressed, composed of two glumes and one floret. *Glumes* very unequal, hairy, without lateral ribs, the outer glume much the smaller. *Floret* of two paleæ of unequal lengths, the outer palea the shorter, about the length of the large glume, hairy and without lateral ribs; the inner palea longer than the outer, with two delicate ribs not fringed. *Stamens* three. *Styles* partly united. *Stigmas* feathery. *Anthers* erect, linear, entire at the top, cloven at the base. *Filaments* long and slender.

Obs.—*Spartina stricta* is distinguished from *Spartina alterniflora* in the *glumes* being distinctly hairy. *Large* glume without lateral ribs, and one-third longer than the small glume. *Outer* palea hairy, without lateral ribs. *Inner* palea longer than the large glume (see Fig. 1);—whereas in *Spartina alterniflora* the *glumes* are not hairy except on the keel of the large glume. *Large* glume five-ribbed, and more than twice the length of the small glume. *Outer* palea three-ribbed and not hairy. *Inner* palea shorter than the large glume.

Spartina stricta, Kunth, Koch, Smith, Hooker, Lind., Bab. *Dactylis stricta,* Linn., Eng. Bot., Knapp, With.

[illegible]

Parnell M.D. del. et sculp.

[illegible]

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This grass grows on muddy salt marshes, and does not thrive beyond the influence of the sea spray. It is found on the east and south-east coasts of England, principally on the muddy flats at the mouths of rivers. It has not been discovered either in Scotland or Ireland. Is also a native of France and Italy.

Flowers in August, and ripens its seed in the middle of September. Of no agricultural use.

The accompanying figure was taken from specimens gathered near Ipswich.

Explanation of Plate LXXIV. *Spartina stricta,* natural size.

Fig. 1. Spikelet showing the two glumes and the two paleæ.
2. Floret showing the outer and inner palea.
3. Ligule very short, natural size.
4. Ovarium, pistils, and stamens.

Magnified.

SPARTINA ALTERNIFLORA.

Many-Spiked Cord-Grass.

Plate LXXV.

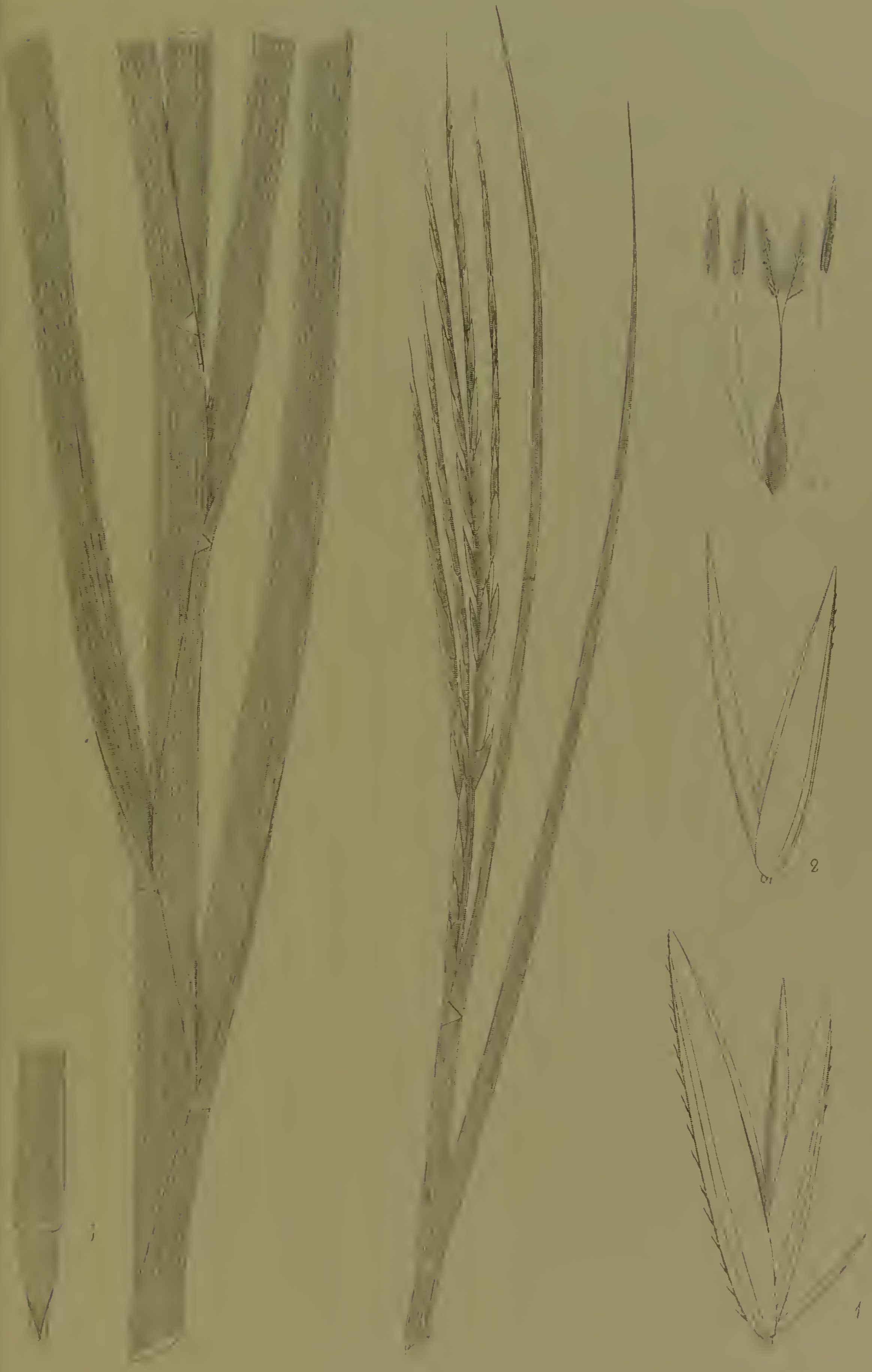
Specific Characters.—Outer glume not half the length of the inner. Inner palea shorter than the large glume.

Description.—Root perennial, creeping, with very long runners. *Stem* smooth, hollow, striated, sheathed to the summit, from eighteen inches to two feet high, bearing numerous leaves with smooth striated sheaths, clothed for some distance upwards with withered persistent leaves of earlier growth; the upper sheath longer than its leaf. *Ligule* very short, obtuse, jagged or fringed, about five times as broad as long. *Joints* numerous, all covered by the sheaths. *Leaves* often a foot or more in length, six to ten lines in breadth, alternate, rather rigid and erect, flat to within an inch or two of their points, where the edges are involute; the uppermost leaf extending beyond the spikes, excepting in young immature specimens; all the leaves are persistent and continuous with their sheaths. *Inflorescence* of four to thirteen spikes, forming a close, compact, spike-like panicle, bearing several erect, sessile spikelets, arranged alternately on one side of the smooth, angular rachis. *Rachis* terminating into a flexuose awn-like point. *Spikelets* laterally compressed, of a lanceolate form, composed of two glumes and one floret. *Glumes* very unequal, the outer glume much the smaller, membranous, lanceolate, about one-third the length of the inner glume; inner glume considerably the larger, of a lanceolate form, five-ribbed, the middle or keel fringed with small bristle-like hairs, pointing upwards; no hairs on any other part of the glumes. *Floret* of two paleæ, shorter than the glumes; outer palea three-ribbed, acute, not hairy; inner palea the longer, very thin, acute, margins not fringed. *Stamens* three. *Filaments* capillary, not as long as the floret. *Anthers* erect, linear, entire at the top, cloven at the base. *Styles* partly united. *Stigmas* feathery.

Obs.—*Spartina alterniflora* is distinguished from *Spartina stricta*

Spartina alterniflora, Kunth, Hooker, Bab., Engl. Bot., Sup.

PLATE LXXV.



Spartina alterniflora

R. Parnell M.D. delt et sculpt

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Published by Wm Blackwood & Sons Edinburgh & London.

in the *glumes* not being hairy, except on the keel of the large glume. *Large* glume five-ribbed. *Outer* palea three-ribbed, not hairy. *Inner* palea not as long as the larger glume;—whereas in *Spartina stricta* both the *glumes* are distinctly hairy. *Large* glume without lateral ribs. *Outer* palea hairy, without lateral ribs. *Inner* palea longer than the large glume.

This grass, although found in great profusion on mud banks of the Itchen and Southampton rivers, has not been noticed in any other part of Britain. It is a strong reed-like grass, and when recently gathered is said to emit a powerful fetid odour resembling that of phosphuretted hydrogen gas. Horses and pigs eat it greedily, and the poorer class of people use it for thatching. It is likewise a native of North America.

Flowers in August and September, and ripens its seed in October.

The accompanying figure was taken from specimens gathered near Southampton.

Explanation of Plate LXXV. *Spartina alterniflora*, natural size.

Fig. 1. Spikelet showing the two glumes, and the outer and inner paleæ of the floret.
2. Floret showing the two paleæ.
3. Ligule, natural size.
4. Ovarium, pistils, and stamens.
} Magnified.

ALOPECURUS BULBOSUS.

Bulbous Foxtail Grass.

Plate LXXVI.

Specific Characters.—Root bulbous. Floret abrupt at the summit. Awn extending half its length beyond the floret.

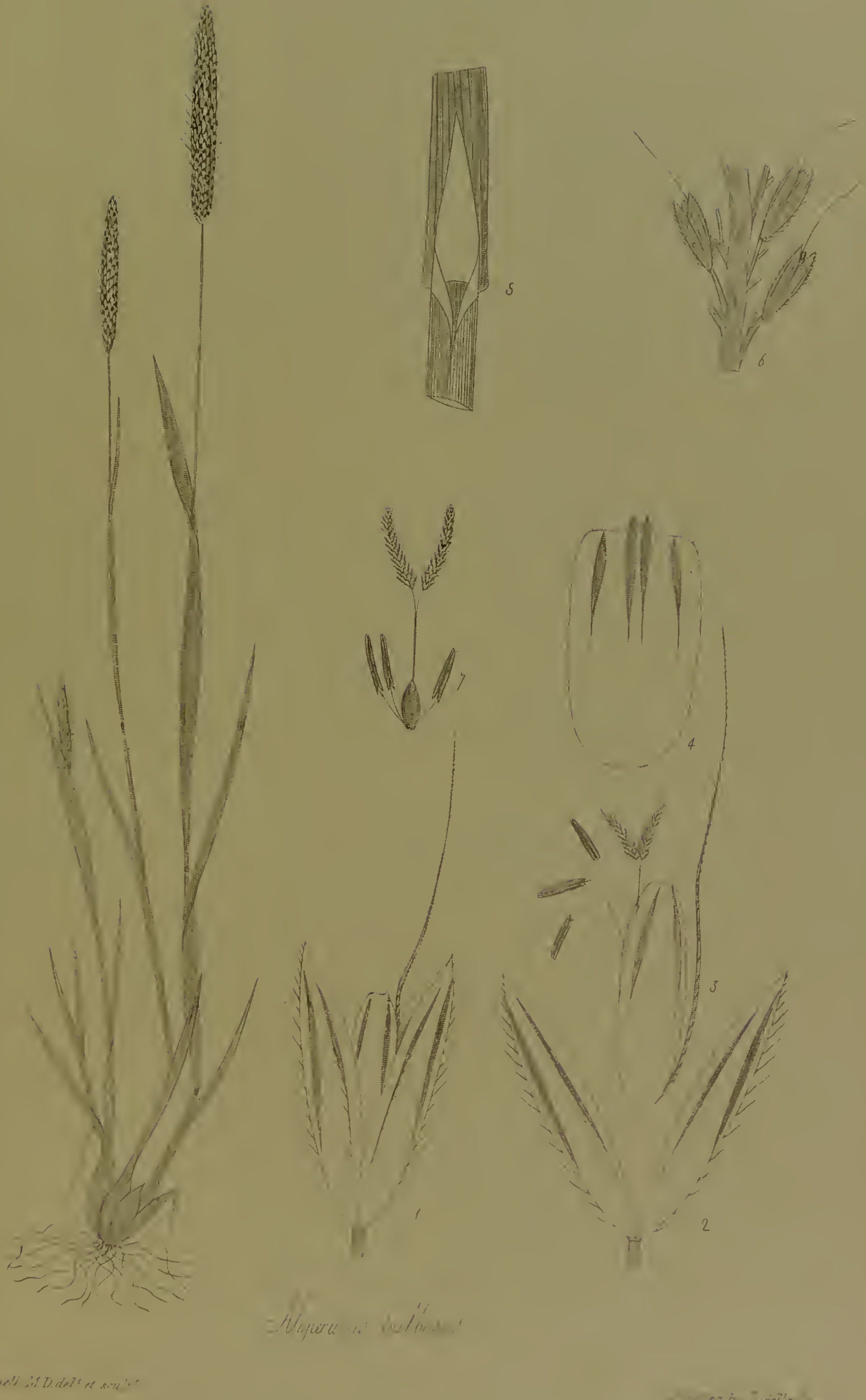
Description.—Root perennial, tuberous. *Stem* ascending, bent at the joints, smooth, hollow, slender, and striated, from four to fifteen inches in length, bearing three or four leaves, with smooth, striated sheaths; the upper sheath rather longer than its leaf. *Ligule* of the upper sheath long and pointed, its length about equal to twice its breadth. *Joints* four, wide apart, the upper one situated rather below the centre of the stem, and not covered by the second sheath. *Leaves* rather narrow, flat, acute, rough on the inner surface and edges, smooth behind. *Inflorescence* racemed, or approaching to simple panicled, usually from an inch to an inch and a half in length, compact, with very short footstalks arranged on all sides of the rachis. *Spikelets* numerous, crowded, compressed, composed of two glumes and one floret. *Glumes* of equal length, pointed, obliquely truncated on the inner margin, separated the whole length to the base, hairy on the keels and lateral ribs. *Floret* one-fifth shorter than the glumes, of one palea, truncated, with two green ribs on each side; when the palea is opened the central ribs terminate in two conical points. *Awn* arising from a little above the base of the palea and extending half its length beyond the summit, rough on the upper part, smooth and twisted below. *Filaments* three, slender. *Anthers* protruding. *Styles* combined. *Stigmas* long and feathery.

Obs.—Alopecurus bulbosus is distinguished from *Alopecurus agrestis* in the *stem* and sheaths being smooth. *Floret* truncated at the summit. *Awn* extending half its length beyond the summit of the palea;—whereas in *Alopecurus agrestis* the *stem* and sheaths are rough to the touch. *Floret* conical at the summit. *Awn* extending more than half its length beyond the summit.

Alopecurus bulbosus is distinguished from *Alopecurus pratensis* in the *floret* being about the one-fifth shorter than the glumes, and trun-

Alopecurus bulbosus, Linn., Eng. Bot., Knapp, Smith, Hooker, Bab., Lind., Kunth.

PLATE LXXVI.



Alopecurus bulbosus.

R. Parnell M.D. delt et sculpt

Printed by J. Kelly

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cated at the summit. *Glumes* not united at the base;—whereas in *Alopecurus pratensis* the *floret* is equal in length to the glumes and conical at the summit. *Glumes* united below.

Alopecurus bulbosus is distinguished from *Alopecurus geniculatus* in the *glumes* being more pointed. *Palea* when opened terminate in two conical points in the centre, formed by a slight prolongation of the two central ribs, (see Fig. 4);—whereas in *Alopecurus geniculatus* the *glumes* are more obtuse at the summit. *Palea,* when opened, slightly notched in the centre, with no conical points.

Alopecurus bulbosus is distinguished from *Alopecurus fulvus* in the *floret* being obtuse, having an awn extending half its length beyond the summit, (see Fig. 3);—while in *Alopecurus fulvus* the *floret* is conical, with an awn not extending beyond the summit.

This grass grows in wet salt marshes in the counties of Somerset, Gloucester, Glamorgan, Sussex, Suffolk, and Norfolk. It has not been found either in Scotland or Ireland. It also occurs in France, Germany, Spain, Portugal, Italy, Turkey, Greece, and the Islands of the Mediterranean. Of no agricultural use.

Flowers in July, and ripens its seed in the end of August.

The accompanying figure was taken from a specimen gathered in Suffolk.

Explanation of Plate LXXVI. *Alopecurus bulbosus,* natural size.

Fig. 1. Spikelet showing the two glumes and floret.
2. Glumes opened free to the base.
3. Floret of one palea.
4. Palea opened, showing the conical points.
5. Ligule of upper sheath.
6. Rachis and spikelets.
7. Ovarium, pistils, and stamens.

Magnified.

PHLEUM PRATENSE (variety) LONGIARISTATUM.

Long-awned Timothy-Grass.

Plate LXXVII.

THIS variety is distinguished by the awns of the glumes being nearly as long as the glumes themselves, and the root bulbous; in other respects it is similar to *Phleum pratense*, described in page 18. Frequently the inflorescence is not more than half an inch in length, as in Fig. 1, when it greatly resembles *Phleum alpinum*, (Plate VI.), so much so that the two plants are then with difficulty distinguished by any essential character.

This grass is occasionally met with in the neighbourhood of Edinburgh, growing in damp shady places.

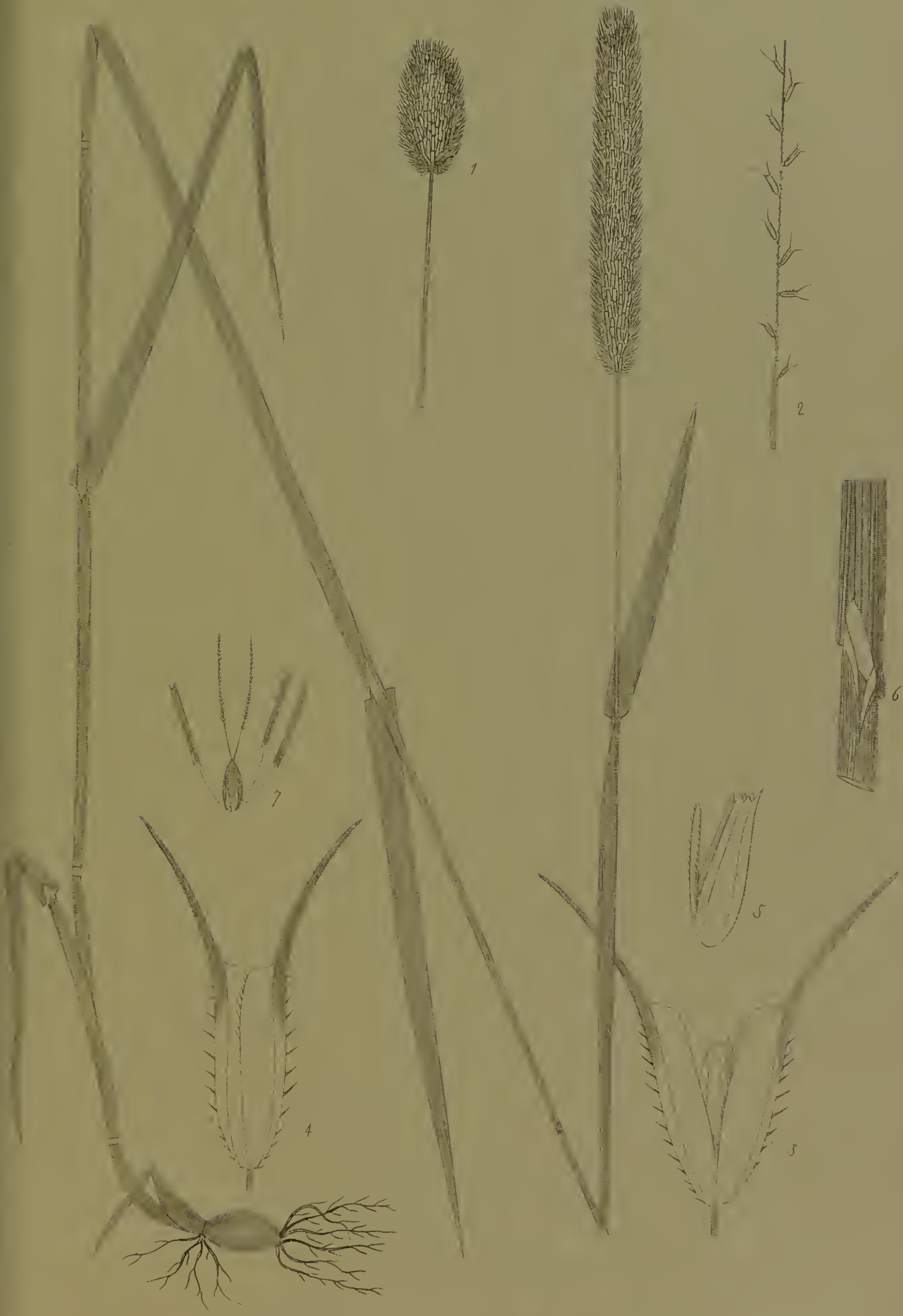
It flowers early in August, and ripens its seed in about the end of September.

The accompanying figure was taken from a specimen gathered in Roslin Wood.

Explanation of Plate LXXVII. *Phleum pratense* (variety) *longiaristatum*, natural size.

Fig. 1. Short-headed variety, natural size.
2. Rachis and spikelets natural size.
3. Spikelet showing the two glumes and floret. } Magnified.
4. Glumes not expanded.
5. Floret showing the two paleæ.
6. Ligule of upper sheath.
7. Ovarium, pistils, and stamens.

PLATE LXXVII.



Phleum pratense (variety) longiaristatum

R. Parnell. M.D. del.^{t} et sculp.^{t}

Printed by Gellatly

Published by W^m Blackwood & Sons. Edinburgh & London

PHLEUM PRATENSE (variety) LONGICILIATUM.

Bulbous Timothy-Grass.

Plate LXXVIII.

This grass appears to be the *Phleum nodosum* of some authors, which is merely a variety of *Phleum pratense,* with bulbous roots. It seldom grows to more than a foot in length. The lower part of the stem is prostrate and bent at the joints. The awns of the glumes are short, and the hairs on the keels are longer than in *Phleum pratense.*

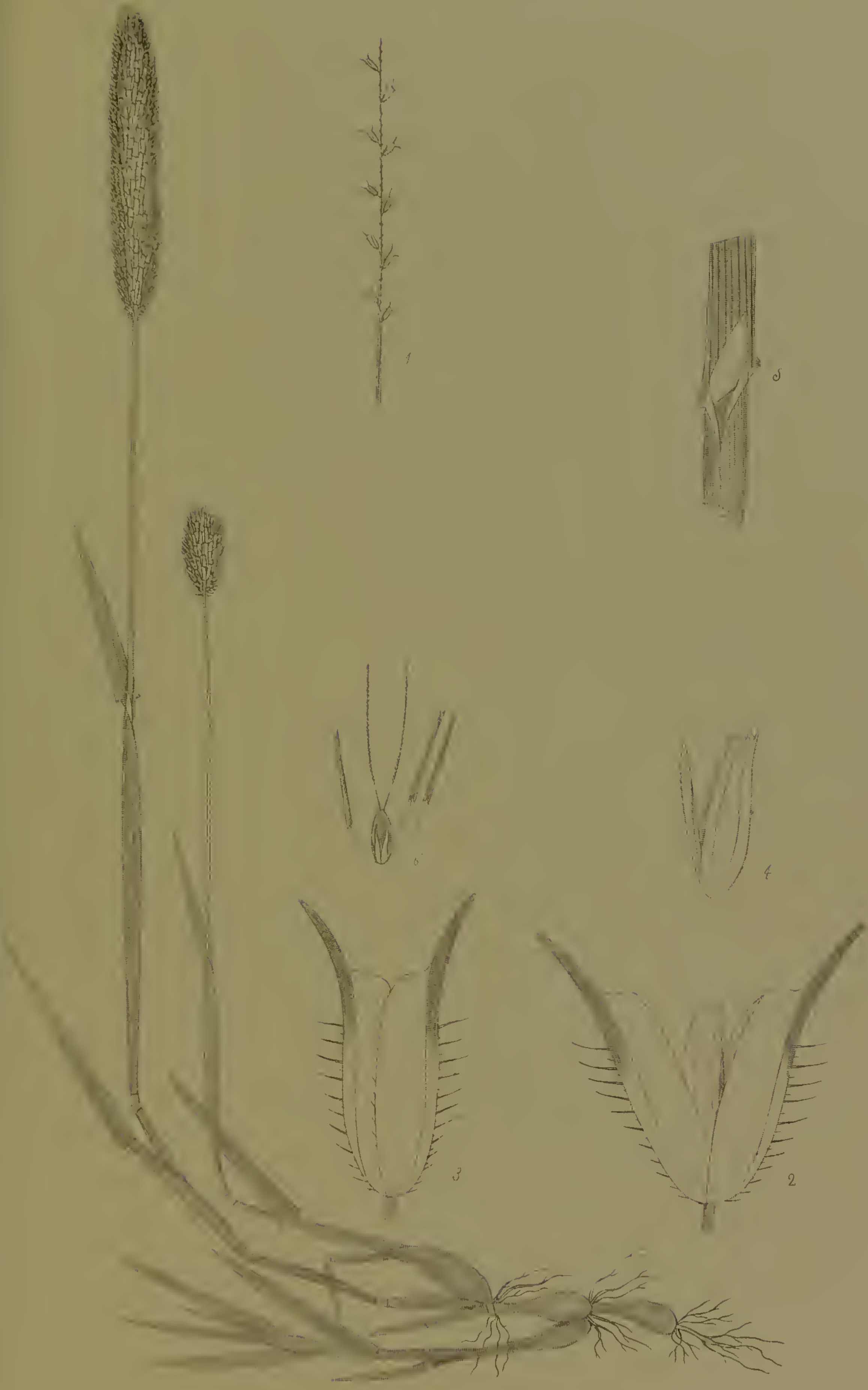
It grows in sandy or barren situations, and flowers in about the end of July. It possesses no agricultural merits worthy of notice.

The accompanying figure was taken from a specimen gathered on the west coast of Cantire, growing on sandy soil.

Explanation of Plate LXXVIII. *Phleum pratense* (variety) *longiciliatum*, natural size.

Fig. 1. Rachis and spikelets, natural size.
2. Spikelet showing the two glumes and floret.
3. Spikelet closed, showing the long stout hairs on the keels, which do not extend the whole length of the keels but terminate abruptly.
4. Floret showing the two paleæ.
5. Ligule of upper sheath.
6. Ovarium, pistils, and stamens.

(Figs. 2–6: Magnified.)



Phleum pratense (var) longiciliatum

R. Parnell M.D. delt et sculpt

Printed by J. Gellatly.

Published by Wm Blackwood & Sons. Edinburgh & London

PHLEUM ASPERUM.

Rough Cat's-tail Grass.

Plate LXXIX.

Specific Characters.—Glumes wedge-shaped. Keels rough.

Description.—Root perennial, fibrous. *Stem* erect, round, hollow, smooth, from six to eighteen inches high, bearing four or five leaves with somewhat roughish inflated sheaths, the upper sheath longer than its leaf. *Ligule* prominent and pointed, twice as long as broad. *Joints* usually four, all covered by the sheaths, the upper joint situated above the centre of the stem. *Leaves* flat, acute, roughish on both surfaces as well as on the edges. *Inflorescence* panicled, from two to five inches in length, compact, with the branches arranged mostly in threes. *Spikelets* numerous, compressed, composed of two glumes and one floret. *Glumes* of equal lengths, pointed, rough, wedge-shaped, variegated with green and white, the inner margins membranous, straight, and obtuse at the summit. *Floret* about one-third shorter than the glumes, of two paleæ, the outer palea roughish, obscurely five-ribbed, hairy on the upper part of the central rib, and obtuse at the summit; inner palea rather smaller, folded at the margins. *Filaments* three, capillary. *Anthers* cloven at each end. *Styles* two, distinct. *Stigmas* feathery. *Seed* cylindrical, loose.

Obs.—Phleum asperum is distinguished from *Phleum pratense* in the *glumes* being wedge-shaped, pointed. *Keels* rough. *Floret* entire at the summit;—whereas in *Phleum pratense* the *glumes* are more of a cylindrical form, terminating in two prominent rough awns. *Keels* fringed with conspicuous bristle-like hairs. *Floret* jagged and minutely awned at the summit.

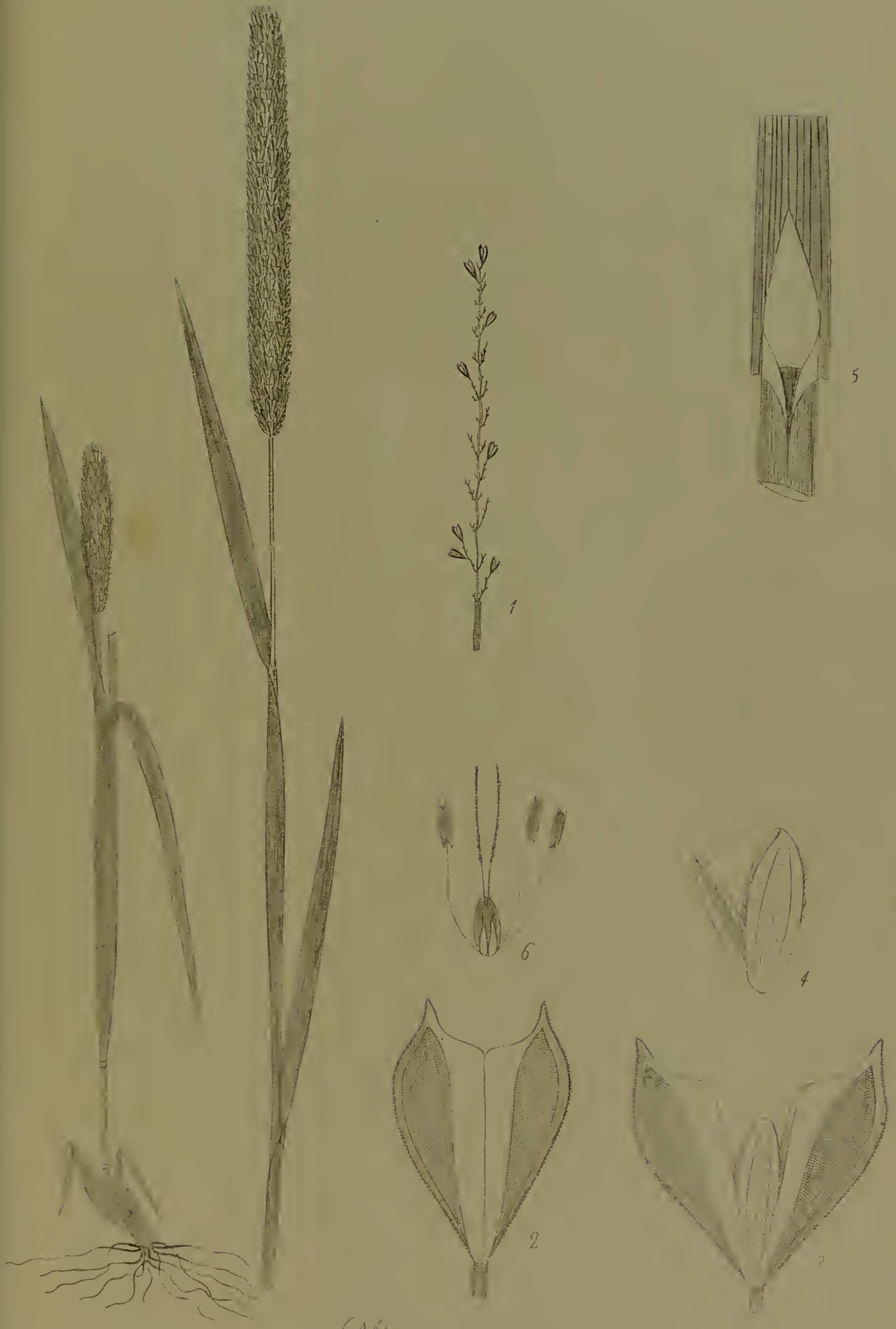
Phleum asperum is distinguished from *Phleum Michelii* in the *glumes* being wedge-shaped, swelling upwards, abrupt at the inner margins. *Keels* rough, not hairy;—whereas in *Phleum Michelii* the *glumes* are lanceolate, acute. *Keels* very hairy.

Phleum asperum is distinguished from *Phleum arenarium* in the

---

Phleum asperum, Koch, Smith, Hooker, Bab., Lind., Schrad. *Phleum paniculatum*, Huds., Eng. Bot., Knapp. *Phalaris aspera*, Retz, Willd., Host.

PLATE LXXIX.



Phleum asperum

R. Parnell M.D. delt et sculpt

Printed by S. Gellatly.

Published by Wm Blackwood & Sons Edinburgh & London

glumes being wedge-shaped, swelling upwards, abrupt at the inner margins. *Keels* rough, not hairy. *Floret* about one-third shorter than the glumes and entire at the summit, (see Fig. 3.);—whereas in *Phleum arenarium* the *glumes* are lanceolate, acute. *Keels* hairy on the upper half. *Floret* about one-third the length of the glumes, and jagged at the summit.

Phleum asperum is distinguished from *Phleum Boehmeri,* in the *glumes* being wedge-shaped, swelling upwards. *Keels* rough, not hairy. *Ligule* lanceolate;—whereas in *Phleum Boehmeri* the *glumes* are of a linear form. *Keels* on the upper half fringed with a few conspicuous bristly hairs. *Ligule* obtuse, short.

This grass is of so little profit to the farmer that it would not pay him to cultivate, the produce being much inferior to that of most other grasses. The culms are numerous, and the foliage in the spring is comparatively nothing. It is a rare grass in Britain, having been found but few times in the counties of Oxford, Cambridge, Gloucester, and Bedford. It is also a native of France, Prussia, Holland, Belgium, Switzerland, and Italy. It grows naturally in dry sandy places, but thrives best on a sandy loam. Its limit of altitude is about 1000 feet above the level of the sea.

Flowers in July, and ripens its seed early in September.

The accompanying figure was taken from a foreign specimen.

Explanation of Plate LXXIX. *Phleum asperum*, natural size.

Fig. 1. Rachis and spikelets natural size.
2. Spikelet.
3. Spikelet showing the two glumes and floret.
4. Floret showing the two paleæ.
5. Ligule of upper sheath.
6. Ovarium, pistils, and stamens.
Magnified.

PHLEUM BOEHMERI.

Purple-stalked Cat's-tail Grass.

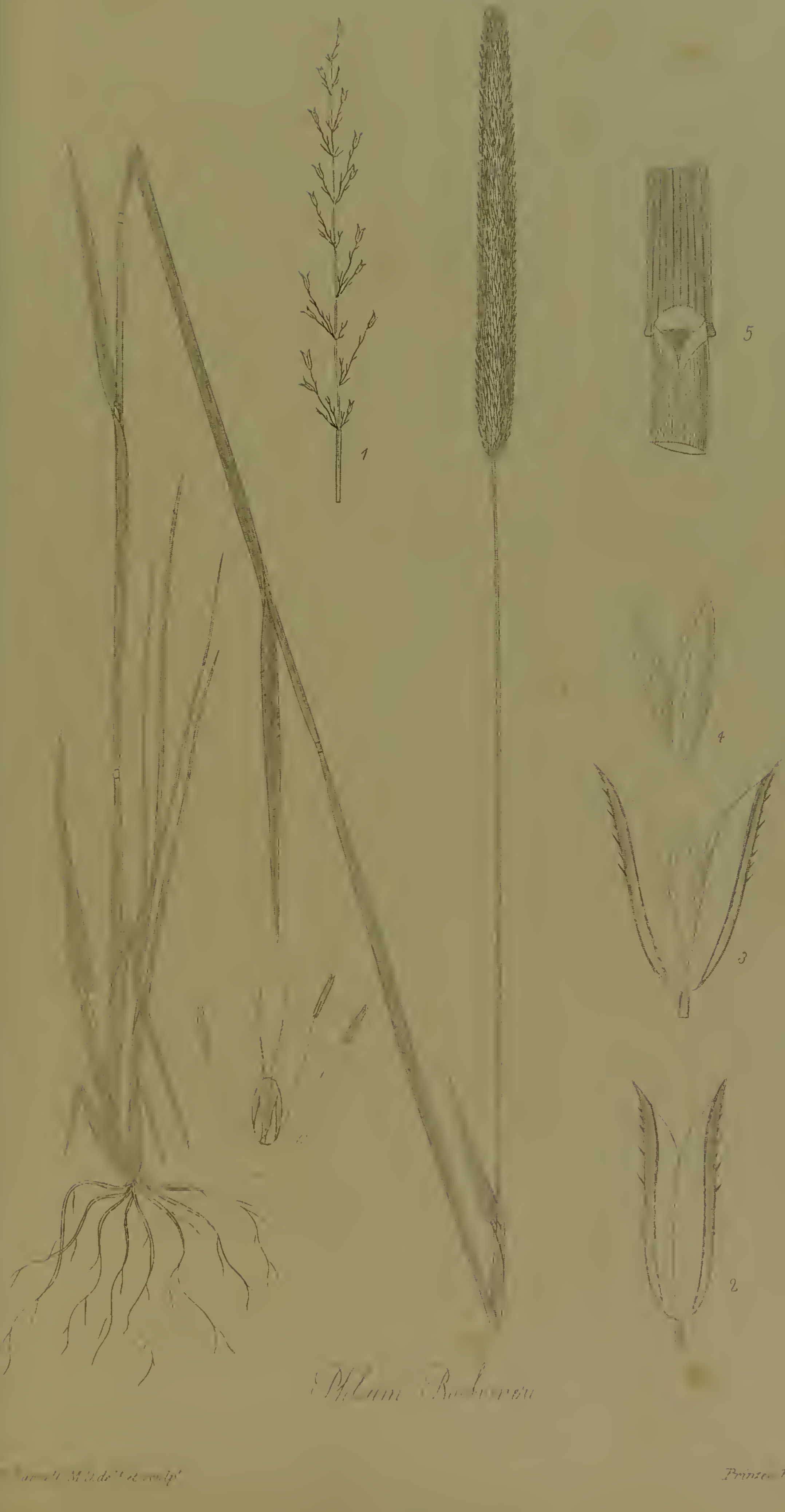
Plate LXXX.

Specific Characters.—Glumes hairy on the upper half of the keels. Floret one-third shorter than the glumes, and entire at the summit.

Description.—Root perennial, fibrous, tufted. *Stem* erect, smooth, hollow, striated, and polished, from six to eighteen inches high, frequently, but not invariably tinged with purple, bearing four or five leaves, with smooth, striated sheaths, the upper sheath much longer than its leaf, more or less inflated. *Ligule* of upper sheath half as long as broad, obtuse, embracing the stem. *Joints* usually four, the upper situated below the centre of the stem, and not covered by the second sheath, excepting when young. *Leaves* flat, acute, roughish on both surfaces, as well as on the edges; the upper leaf much the smallest, those from the root more linear. *Inflorescence* panicled, close, usually from one and a half to two inches in length, of a cylindrical form, when small approaching to oval; rachis and branches roughish. *Spikelets* numerous, small, compressed, arranged on all sides, composed of two glumes and one awnless floret, shorter than the glumes by one-fourth. *Glumes* of equal size, linear, divaricating at the points, the margins white and membranous, terminating obliquely at the summit; the keels fringed with a few short white hairs, especially on the upper half. *Floret* of two paleæ, the outer palea five-ribbed, roughish on the upper part of the central rib, entire at the summit. Inner palea about equal in length to the outer, membranous and entire at the margins. *Ovarium* hairy on the upper part. *Scales* prominent, hairy. *Styles* two, distinct, arising from the summit of the ovarium. *Stigmas* feathery. *Stamens* three.

Obs. In Sir William Hooker's British Flora, it is stated that the keels of the glumes are downy, while Sir James Smith asserts them to be more or less fringed with a few *bristles,* not soft hairs. In all those specimens which I have examined, the keels of the glumes were never downy, but always fringed with short, stout, white hairs, espe-

Phleum Boehmeri, Schrader, Koch, Smith, Kunth, Hooker, Lind., With., Bab. *Phalaris phleoides,* Linn. *Chilochloa Böhmeri,* Beauv.



Phleum Boehmeri

R. Parnell M.D. del^t et sculp^t

Printed by J. Gellatly.

Published by W^m Blackwood & Sons Edinburgh & London.

cially on the upper half. I think it probable, therefore, that two species may have been confounded under one name.

Phleum Boehmeri is distinguished from *Phleum pratense* in the *glumes* not being awned, but pointed. The *keels* less hairy, the hairs confined to the upper half. *Inner* margins of the glumes terminating obliquely. *Outer* palea entire at the summit;—whereas in *Phleum pratense* the *awns* are very conspicuous. The *keels* fringed with hairs the whole length, or nearly so, and the *inner* margins terminate abruptly. *Outer* palea jagged at the summit, with a minute awn or point.

Phleum Boehmeri is distinguished from *Phleum Michelii* in the *glumes* being more linear, the inner margins terminating more abruptly. *Upper* half of the keels bristly;—whereas in *Phleum Michelii* the *glumes* are acutely lanceolate, and the *keels* are fringed their whole length with soft, delicate hairs.

Phleum Boehmeri is distinguished from *Phleum arenarium* in the *inner* margins of the glumes not being fringed. The *floret* one-fourth shorter than the glumes, and entire at the summit;—whereas in *Phleum arenarium* the *inner* margins of the glumes are distinctly fringed with minute hairs. The *floret* two-thirds shorter than the glumes, and jagged at the summit.

Phleum Boehmeri is distinguished from *Phleum asperum* in the *glumes* approaching to linear; the points divaricating. *Keels* fringed with a few bristle-like hairs, especially on the upper half. *Ligule* rather short and obtuse;—whereas in *Phleum asperum* the *glumes* are wedge-shaped; the points not divaricating. *Keels* rough, but not fringed. *Ligule* long and pointed.

This is a rare British grass, and grows on dry, sandy, and chalky fields principally in Norfolk and Cambridgeshire. It has not been found either in Ireland or Scotland. It is a native of Norway, Sweden, France, Germany, Switzerland, Italy, and Russia. It possesses no agricultural merits.

Flowers in July, and ripens its seed in the middle of August.

The accompanying figure was taken from a specimen gathered in Cambridgeshire.

Explanation of Plate LXXX. *Phleum Boehmeri,* natural size.

Fig. 1. Rachis and spikelets natural size.
2. Spikelet.
3. Spikelet showing the two glumes and floret.
4. Floret showing the two paleæ.
5. Ligule of upper sheath.
6. Ovarium, pistils, and stamens.

Magnified.

N

POLYPOGON LITTORALIS.

Perennial Beard-Grass.

Plate LXXXI.

Specific Characters.—Awns of the glumes about equal in length to their glumes.

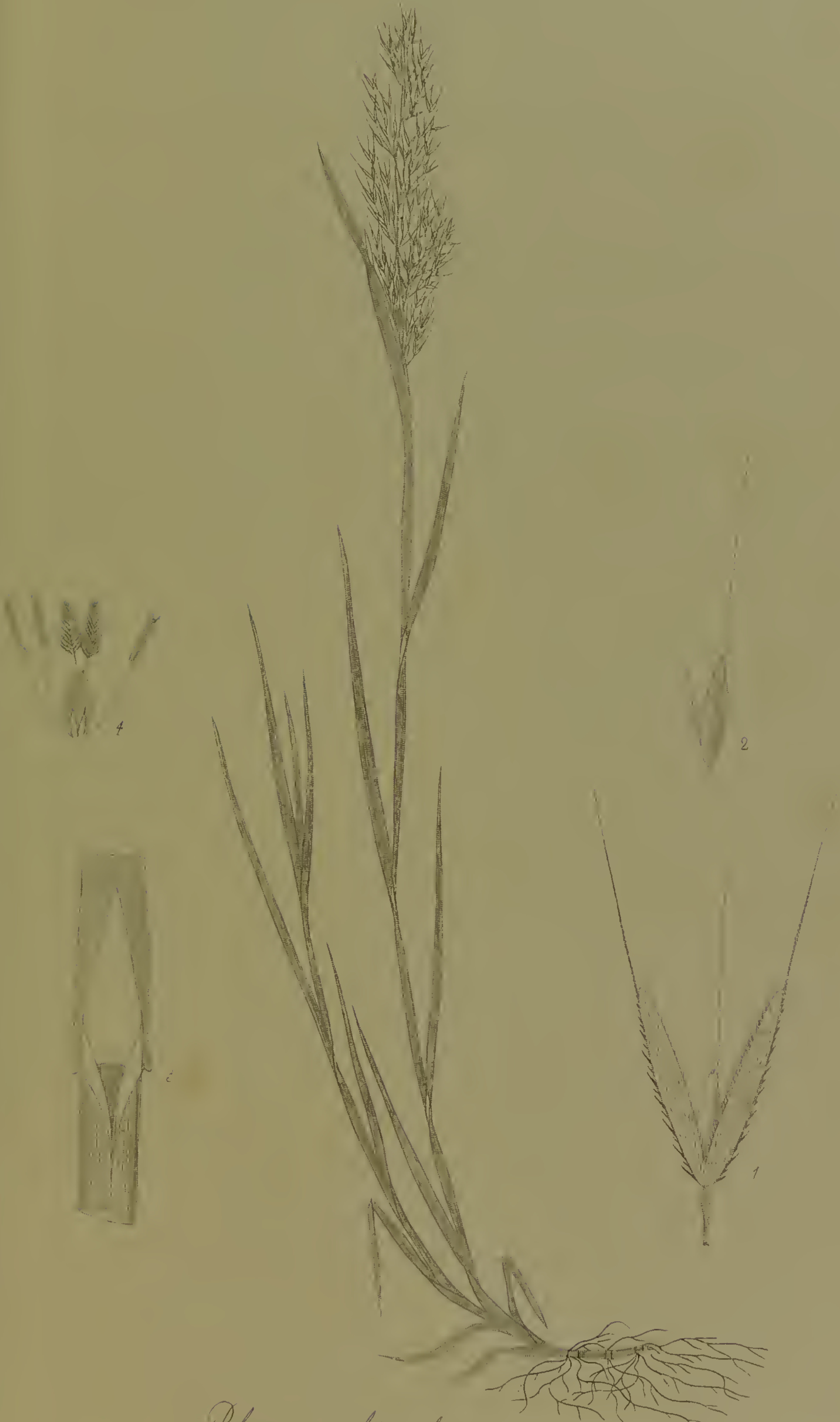
Description.—Root perennial, somewhat creeping. *Stem* erect, round, smooth, hollow, from six to twelve inches high, bearing seven or eight leaves, with smooth, striated sheaths; the upper sheath much longer than its leaf. *Ligule* of upper sheath prominent, acute, about twice as long as broad. *Joints* smooth, the upper situated about the centre of the stem, generally covered by the second sheath. *Leaves* flat, acute, roughish on both surfaces. *Inflorescence* compound panicled; the branches and rachis rough, with minute teeth. *Spikelets* rather small, numerous, laterally compressed, composed of two glumes and one floret. *Glumes* equal, linear, hairy, obtuse, strongly toothed on the keels, without lateral ribs; furnished with a long rough awn, about as long as the glume, arising immediately beneath the summit. *Floret* rather more than half the length of the glumes, of two paleæ of unequal lengths; the outer palea the larger, without lateral ribs, furnished with a slender awn about half as long again as the palea, and arising from a little beneath the cloven summit; the inner palea shorter than the outer, thin and pellucid, with the margins entire. *Stamens* three. *Styles* two, distinct. *Stigmas* feathery. *Scales* two, lanceolate.

Obs.—Polypogon littoralis is distinguished from *Polypogon monspeliensis* in the *awns* of the glumes being about equal in length to their glumes; and the *awn* of the floret nearly twice the length of the floret;—whereas in *Polypogon monspeliensis* the *awns* of the glumes are more than twice the length of the glumes; and the *awn* of the floret is about one-third the length of the floret.

This is one of our rarest British grasses, formerly considered to be

Polypogon littoralis, Smith, Hooker, Lind., Koch., Kunth, Bab. *Agrostis littoralis*, Eng. Bot., With., Knapp.

PLATE LXXXI.



Polypogon littoralis

R. Parnell, M.D. del.t et sculp.t

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peculiar to England, but is now found in Germany. It grows naturally in muddy salt-marshes near Cley, Norfolk; on the Essex coast; and near the powder magazine, about four miles from Woolwich.

Flowers in July, and ripens its seed about the end of August. Of no agricultural importance.

The accompanying figure was taken from a specimen gathered in Norfolk.

Explanation of Plate LXXXI. *Polypogon littoralis,* natural size.

Fig. 1. Spikelet showing the two glumes and floret.
2. Floret showing the two paleæ.
3. Ligule of upper sheath.
4. Ovarium, pistils, and stamens.
Magnified.

PHALARIS ARUNDINACEA (variety) VARIEGATA.

Variegated Reed Canary-Grass.

Plate LXXXII.

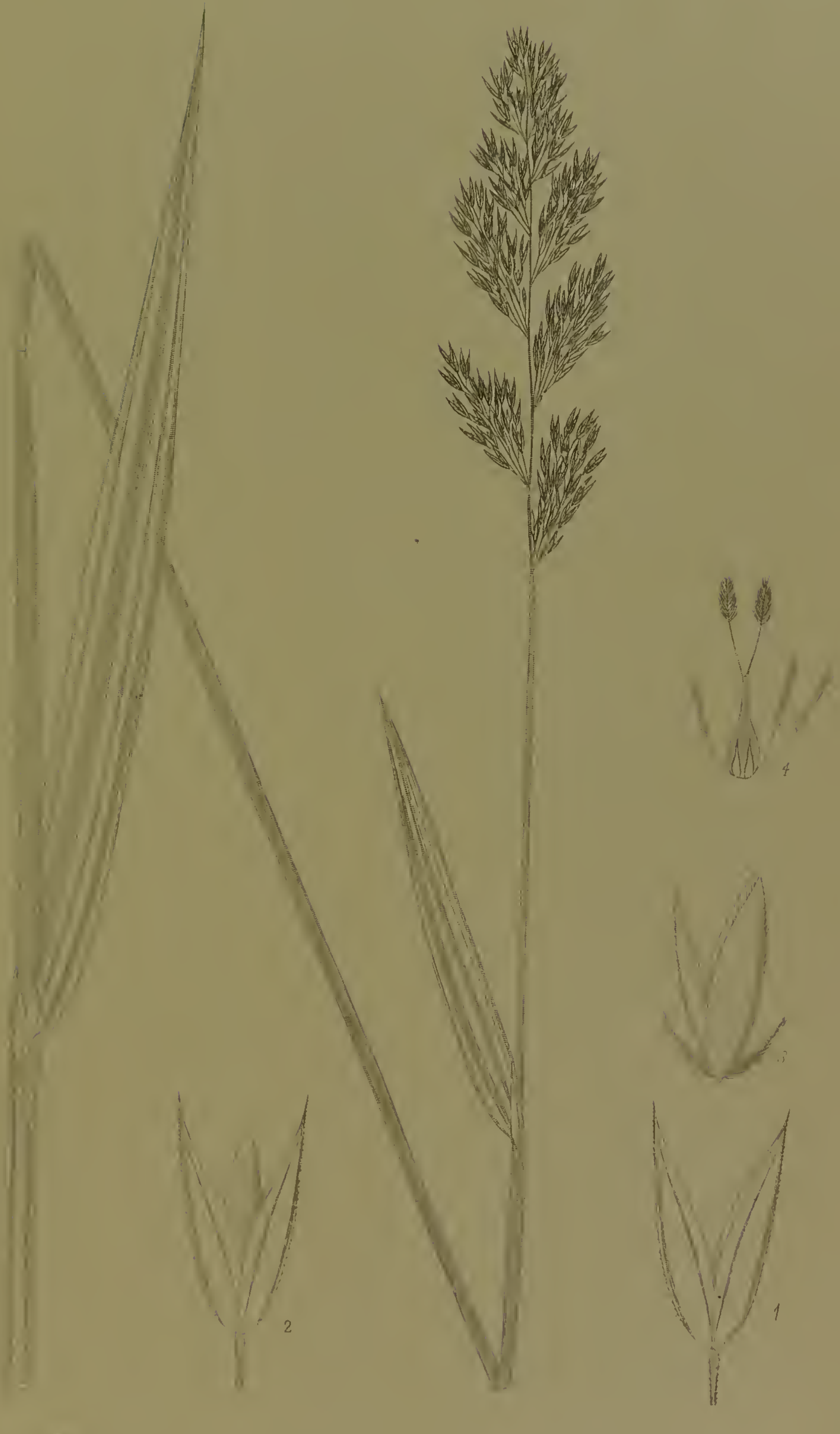
This grass must be familiar to most persons. It is cultivated in gardens for its beauty, and is known by the name of "Gardeners' Garters." The leaves are flat and pointed, and beautifully variegated with a broad line of green and white. In other respects it is similar to *Phalaris arundinacea* described in page 27.

The accompanying figure was taken from a specimen gathered in a pond near Killin, Perthshire.

Explanation of Plate LXXXII. *Phalaris arundinacea* (variety) *variegata,* natural size.

Fig. 1. Two glumes.
2. Spikelet showing the two glumes and floret.
3. Floret showing the two paleæ and hairy linear scales at the base.
4. Ovarium, pistils, and stamens.

Magnified.



Phalaris arundinacea (variety) variegata

[illegible] del. & sculp.

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AGROSTIS SETACEA.

Bristle-leaved Bent-Grass.

Plate LXXXIII.

Specific Characters.—Sheaths rough. Ligule long and pointed. Inner palea one-fourth the length of the outer.

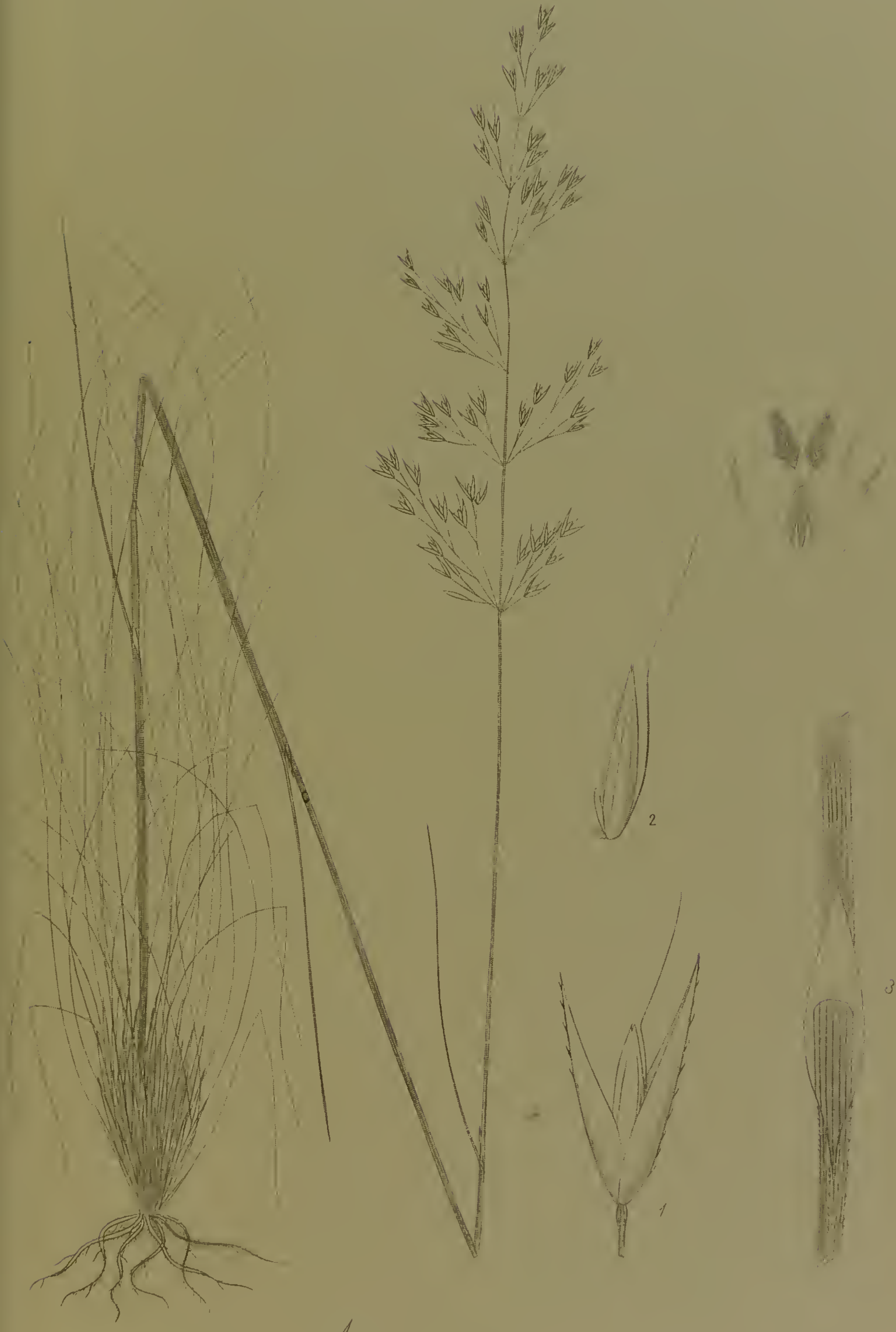
Description.—Root perennial, fibrous, tufted. *Stem* round, striated, hollow, roughish, from eight to fifteen inches in length, bearing four or five leaves with rough, striated sheaths; the upper sheath much longer than its leaf. *Ligule* of upper sheath prominent, acute, about twice as long as broad. *Joints* usually three, the upper situated about the middle of the stem, and not covered by the second sheath. *Leaves* narrow, rough from point to base; those of the root numerous, long, and setaceous. *Inflorescence* compound panicled, erect, spreading while in flower, otherwise close, the branches rough, slender, and rather short, arising from the rough rachis in threes or fives. *Spikelets* numerous, small, acute, composed of two glumes and one floret. *Glumes* nearly of equal lengths, without lateral ribs, the outer the larger, toothed nearly the whole length of the keel. *Floret* shorter than the glumes, of two very unequal paleæ, the outer the larger, four-ribbed, jagged at the summit, hairy at the base, furnished with a long, slender, roughish awn, arising from a little above the base and extending about half its length beyond the summit. Inner palea very small, about one-fourth the length of the outer palea. *Styles* two, distinct. *Stigmas* feathery. *Filaments* three. *Anthers* cloven at each end. *Scales* acute.

Obs.—Agrostis setacea is distinguished from *Agrostis vulgaris* in the *stem* and sheaths being rough to the touch; *ligule* prominent, acute; *inner* palea about one-fourth the length of the outer palea; —whereas in *Agrostis vulgaris* the *stem* and sheaths are smooth; *ligule* short and obtuse; *inner* palea about half the length of the outer.

Agrostis setacea is distinguished from *Agrostis alba* in the *floret* having a long awn arising from a little above the base, and extending half its length beyond the summit of the floret; *inner* palea very

Agrostis setacea, Curt., Eng. Bot., Smith, Knapp, Hooker, Lind., Bab., With.

PLATE LXXXIII.



Agrostis setacea

R. Parnell M.D. del [illegible]

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small, not more than one-fourth the length of the outer; *leaves* from the root setaceous;—whereas in *Agrostis alba* the *floret* has no awn, except occasionally a very short one from a little below the summit; *inner* palea more than half the length of the outer; *leaves* from the root flat, not setaceous.

Agrostis setacea is distinguished from *Agrostis canina* in the *stem* and sheaths being rough; *inner* palea about one-fourth the length of the outer;—whereas in *Agrostis canina* the *stem* and sheaths are smooth, and the *inner* palea is altogether wanting.

This grass grows on dry turfy heaths, and is confined almost entirely to the south-west parts of England. I have frequently seen it in many parts of Devonshire, forming the principal natural herbage on sandy heaths. Sheep are fond of this grass, and thrive well on it; but horses and cows give a preference to those more succulent. It is also a native of France, Germany, Switzerland, Italy, Spain, Portugal, Turkey, and Greece.

Flowers in July and August, and ripens its seed in September.

The accompanying figure was taken from specimens gathered in Devonshire.

Explanation of Plate LXXXIII. *Agrostis setacea*, natural size.

Fig. 1. Spikelet, showing the two glumes and floret.
2. Floret, showing the two paleæ and dorsal awn.
3. Ligule of upper sheath.
4. Ovarium, pistils, and stamens.

Magnified.

CALAMAGROSTIS LANCEOLATA.

Purple-flowered Small-Reed.

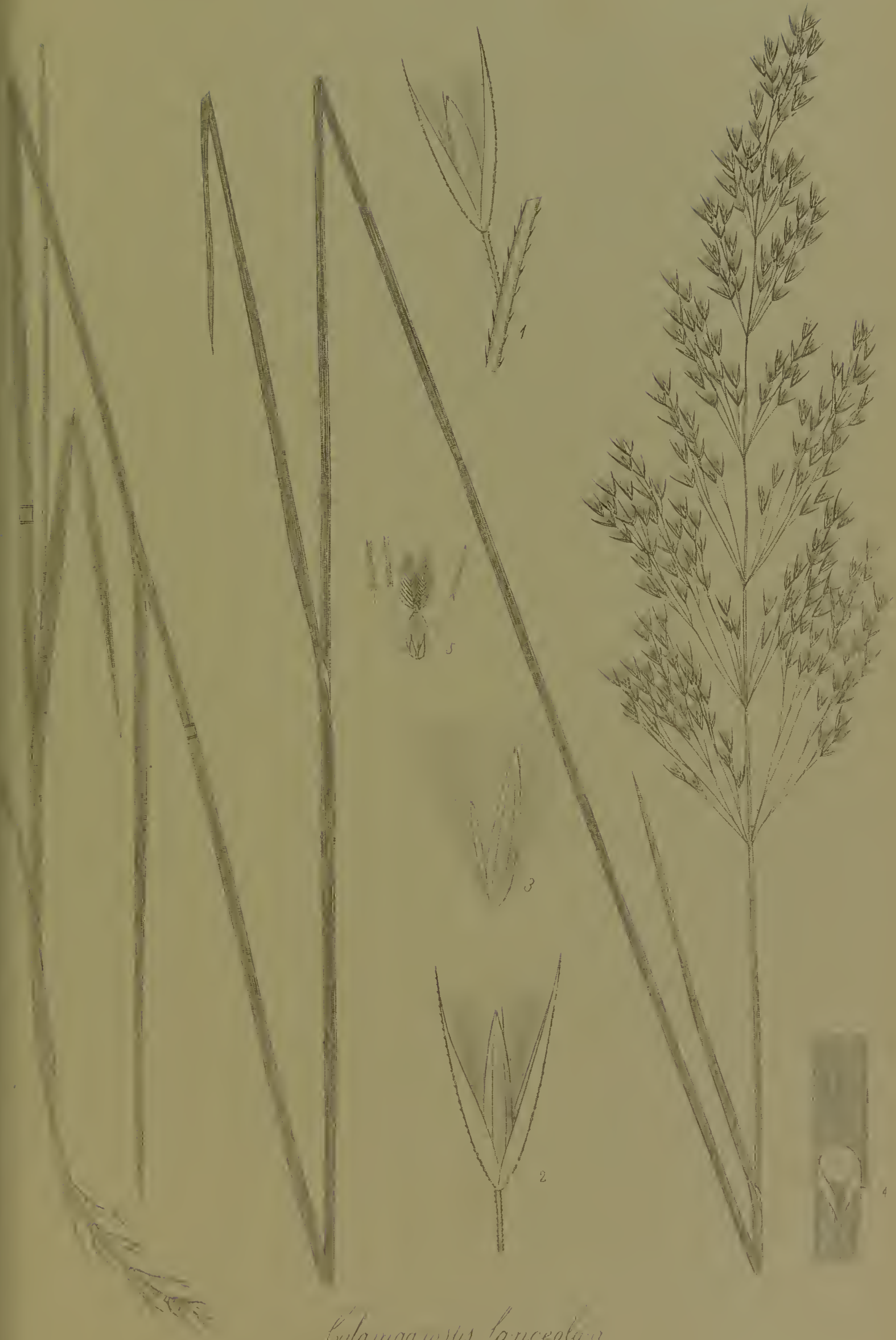
Plate LXXXIV.

Specific Characters.—Hairs longer than their floret. Awn very short, arising from a little below the summit of the palea.

Description.—Root perennial, creeping. *Stem* round, hollow, smooth, and striated, usually about three feet high, bearing four or five leaves with smooth, striated sheaths; the upper sheath longer than its leaf. *Ligule* of upper sheath prominent, obtuse, longer than broad. *Joints* wide apart, the upper situated above the centre of the stem, and not covered by the second sheath. *Leaves* long, narrow, flat, acute, rough on both surfaces and edges. *Inflorescence* compound panicled,. usually from seven to eight inches in length, spreading, while in flower otherwise close, the branches slender and rough, arising in alternate clusters, from the round, rough rachis. *Spikelets* numerous, composed of two glumes and one floret. *Glumes* narrow, acute, about equal lengths, without lateral ribs, often tinged with purple, toothed the whole length of their keels. *Floret* one-third shorter than the glumes, of two paleæ, the outer palea five-ribbed, bifid at the summit, awned from a little beneath the summit, and furnished at the base with a number of long, white, silky hairs extending a little beyond the floret. *Awn* very short, rough and slender, not more than one-sixth the length of the floret, arising from a little beneath the summit of the outer palea, and extending just beyond it. Inner palea about one-third shorter than the outer, very thin and pellucid, cloven at the summit and smooth on the lateral folds. *Styles* two, short. *Stigmas* long and feathery. *Filaments* three, slender. *Anthers* long and cloven at each end. *Scales* acute.

Obs.—*Calamagrostis lanceolata* is distinguished from *Calamagrostis Lapponica* in the floret being one-third shorter than the glumes; *hairs* longer than their floret; *awn* very short, arising from a little beneath the summit of the outer palea;—whereas in *Calamagrostis Lapponica* the *floret* is about equal in length to the glumes; *hairs*

Calamagrostis lanceolata, Koch, Kunth, Hooker, Lind., Bab. *Arundo calamagrostis,* Smith, Knapp, Schrad.



Calamagrostis lanceolata

Parnell M.D. delt et sculpt

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shorter than their floret; *awn* arising from a little beneath the centre, and extending slightly beyond the summit of the palea.

Calamagrostis lanceolata is distinguished from *Calamagrostis Epigegos* in the *awn* of the floret being very short, arising from a little beneath the summit and extending but slightly beyond it;—whereas in *Calamagrostis Epigegos* the *awn* is long, arising from the centre of the palea and extending nearly half its length beyond its summit.

Calamagrostis lanceolata is distinguished from *Calamagrostis stricta* in the *floret* being one-third shorter than the glumes; *hairs* longer than their floret; *awn* arising from beneath the summit of the palea;—whereas in *Calamagrostis stricta* the *floret* is equal in length to the glumes; *hairs* rather shorter than their floret; *awn* arising from a little beneath the centre of the palea.

This grass is found in moist woods and shady places in many parts of England, especially in the counties of Devon, Bedford, Cambridge, Dorset, Sussex, Suffolk, Northampton, Hants, Leicester, Lincoln, York, and Cumberland. It is also found in Ireland, Lapland, Norway, Sweden, France, Germany, Switzerland, Italy, Spain, Portugal, Turkey, Greece, North Africa, Siberia, and British America. It has not been noticed in Scotland.

Flowers in June and July, and ripens its seed about the end of August. Of no agricultural merits worthy of notice.

The accompanying figure was taken from a specimen gathered in Suffolk.

Explanation of Plate LXXXIV. *Calamagrostis lanceolata*, natural size.

Fig. 1. Spikelet and part of the branch.
2. Spikelet showing the two glumes and floret.
3. Floret showing the two paleæ and awn.
4. Ligule of upper sheath.
5. Ovarium, pistils, and stamens.

Magnified.

CALAMAGROSTIS LAPPONICA.

Lapland Small-Reed.

Plate LXXXV.

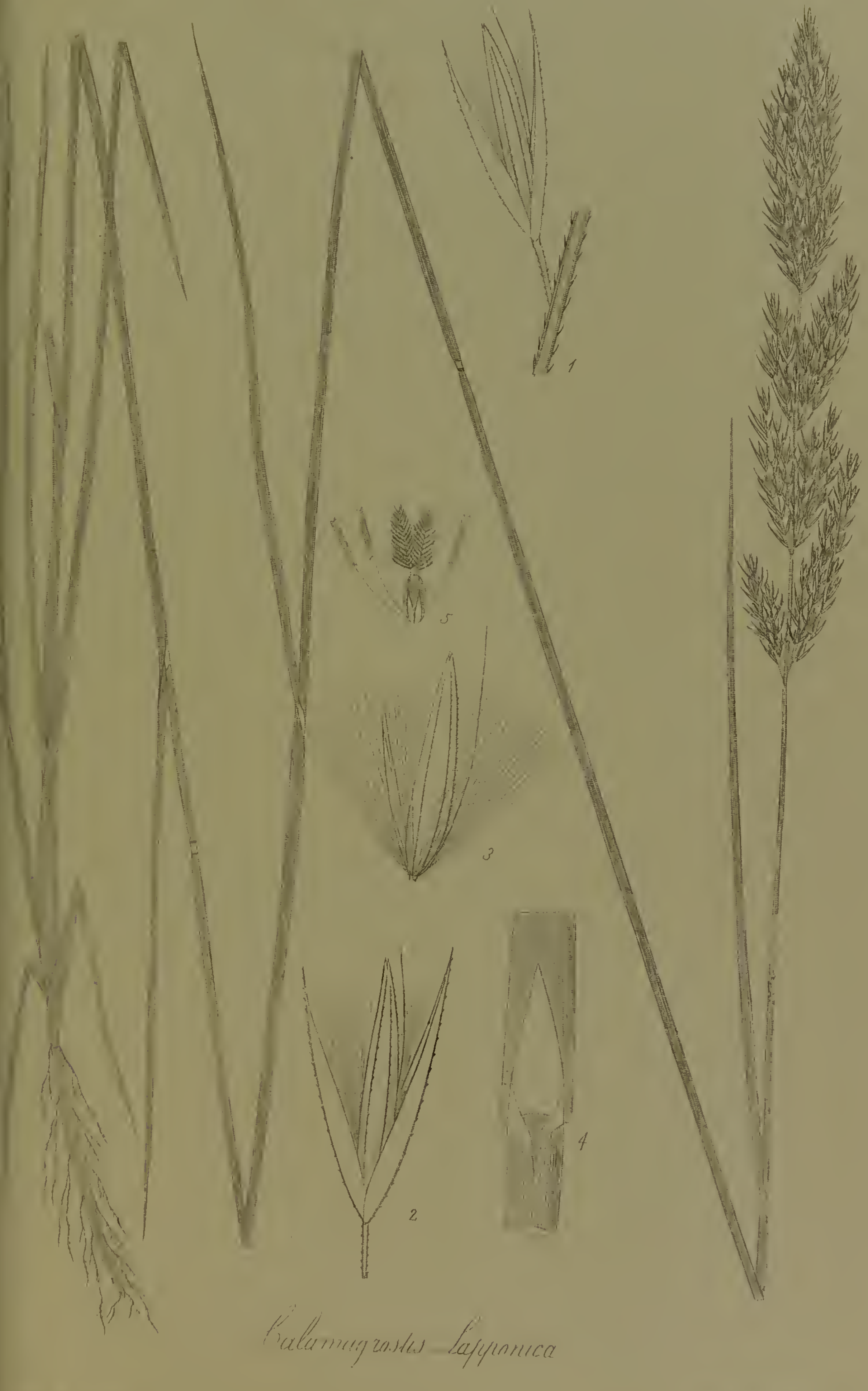
Specific Characters.—Ligule acute. Hairs shorter than their floret. Awn arising from below the centre of the palea.

Description.—Root perennial, creeping. *Stem* round, hollow, smooth and striated, usually about three feet high, bearing four or five leaves with smooth striated sheaths; upper sheath longer than its leaf. *Ligule* of upper sheath prominent, acute, about twice as long as broad. *Joints* wide apart, the upper situated below the centre of the stem, and not covered by the second sheath. *Leaves* long, narrow, and acute, rough on the inner surface and edges, very smooth behind, mostly involute especially when dry. *Inflorescence* compound panicled, of a brownish-purple, erect, close, from three to four inches in length, with rough branches arising in alternate clusters from the round, rough rachis. *Spikelets* numerous, composed of two glumes and one floret. *Glumes* narrow, acute, about equal size, without lateral ribs, tinged with purple, toothed nearly the whole length of their keels. *Floret* about equal in length to the glumes, of two paleæ, the outer palea five-ribbed, rough, bifid at the summit, awned from below the centre, and furnished at the base with a number of long, erect, straight, silky hairs, about one-fourth shorter than the floret; no rudiment of a second floret. Inner palea about one-third shorter than the outer, smooth on the lateral folds. *Awn* rough and slender, arising from a little beneath the centre of the outer palea, and extending a very little beyond the summit. *Styles* two, short. *Stigmas* feathery. *Stamens* three, notched at each end. *Scales* acute.

Obs.—*Calamagrostis Lapponica,* although a very distinct plant from *Calamagrostis stricta*, is with difficulty distinguished by any prominent character. The *spikelets* of *Calamagrostis Lapponica,* however, are larger; the *glumes* narrower; the *hairs* of the floret somewhat shorter; *awn* a trifle longer and the *ligule* acute;—while in *Calamagrostis stricta* the *ligule* is very short and obtuse.

Calamagrostis Lapponica, Harton, Hooker, Bab. *Deyeuxia Lapponica,* Kunth. *Arundo Lapponica,* Wahlenb.

PLATE LXXXV.



Calamagrostis Lapponica

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Calamagrostis Lapponica is distinguished from *Calamagrostis Epigegos* in the *hairs* being shorter than their floret; *awn* scarcely longer than its floret;—whereas in *Calamagrostis Epigegos* the *hairs* are considerably longer than their floret, and the *awn* extends nearly half its length beyond its floret.

Calamagrostis Lapponica is distinguished from *Calamagrostis lanceolata* in the *floret* being about equal in length to the glumes; *hairs* shorter than their floret; *awn* arising from a little beneath the centre of its floret;—whereas in *Calamagrostis lanceolata* the *floret* is one-third shorter than the glumes; *hairs* longer than their floret; *awn* arising from a little beneath the summit of its floret.

This grass grows in Ireland near Loch Neagh, and in other places in the county of Antrim; but in no other part of Britain has it yet been discovered. It is a native of Lapland.

Flowers in June and July. Its agricultural merits probably rank with the preceding.

The accompanying figure was taken from a specimen gathered near Loch Neagh.

Explanation of Plate LXXXV. *Calamagrostis Lapponica*, natural size.

Fig. 1. Spikelet and part of the branch.
2. Spikelet, showing the glumes and floret.
3. Floret, showing the two paleæ and awn.
4. Ligule of upper sheath.
5. Ovarium, pistils, and stamens.
} Magnified.

GASTRIDIUM LENDIGERUM.

Nit-Grass.

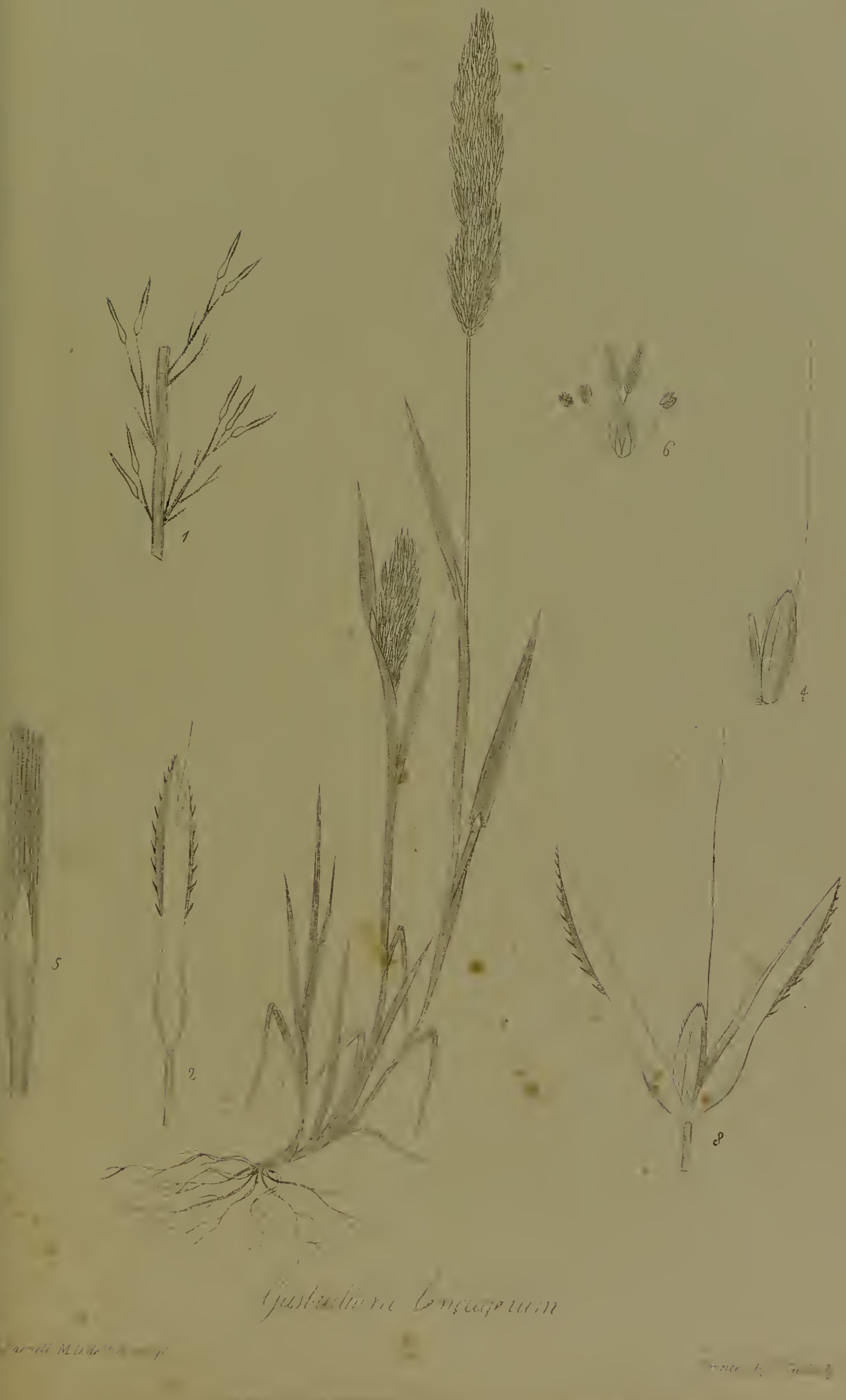
Plate LXXXVI.

Specific Character.—Awn of the floret longer than the glumes.

Description.—Root annual, fibrous. *Stem* erect, round, hollow, smooth, and polished, from six to fifteen inches high, bearing four or five leaves with mostly smooth sheaths; the upper sheath longer than its leaf. *Ligule* prominent, pointed, longer than broad. *Joints* usually three, the upper one generally covered by the second sheath. *Leaves* flat, acute, rough from point to base. *Inflorescence* compound panicled, close, of a pale-green, the branches rough, arising in threes or fours alternately along the round, smooth rachis. *Spikelets* numerous, erect, composed of two glumes and one floret. *Glumes* of rather unequal lengths, acute, swelling at the base, keels green, strongly toothed on the upper half. *Floret* about one-third the length of the glumes, of two paleæ, the outer palea five-ribbed, frequently hairy, jagged at the summit, furnished with a dorsal awn, which is sometimes wanting; the inner palea rather shorter than the outer, notched at the summit and smooth on the lateral ribs. *Awn* slender, rough, arising from a little below the summit of the outer palea, and rather more than twice the length of the palea. *Styles* two, distinct, very short. *Stigmas* feathery. *Filaments* three, slender. *Anthers* notched at each end. *Scales* acute.

Obs.—This grass is easily distinguished from any other British grass by the peculiar glossy tumid appearance at the base of the glumes. It is by no means a common grass. It grows naturally in fields where water has stagnated, especially near the sea, and has been found in the counties of Devon, Dorset, Somerset, Hants, Sussex, Surrey, Essex, Denbigh, and Flint. It is also a native of France, Germany, Switzerland, Italy, Portugal, Spain, Turkey, Greece, North Africa, and the Islands of the Mediterranean. It has not been found in Ireland or Scotland. Not known to be of any agricultural value.

Gastrideum lendigerum, Gaud., Hooker, Lind., Link, Bab. *Gastridium australe*, Beauv., Kunth. *Milium lendigerum*, Linn., Smith, Eng. Bot. *Agrostis ventricosa*, Knapp.



Gastridium lendigerum

Parnell M.D. del.t & sculp.t

Printed by [illegible]

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Flowers in August, and ripens its seed in the end of September. The accompanying figure was taken from a specimen gathered in Essex.

Explanation of Plate LXXXVI. *Gastridium lendigerum,* natural size.

Fig. 1. Rachis and branches.
2. Spikelet.
3. Spikelet, showing the two glumes and floret.
4. Floret, showing the two paleæ and awn.
5. Ligule.
6. Ovarium, pistils, and stamens.

Magnified.

STIPA PENNATA.

Feathery-Grass.

Plate LXXXVII.

Specific Character.—Awn of the floret very long, feathery.

Description.—Root perennial, fibrous. *Stem* erect, round, smooth, hollow, usually about two feet high, bearing four or five leaves, with roughish sheaths, the upper sheath longer than its leaf. *Ligule* of upper sheath hairy, long and pointed, about twice as long as broad. *Joints* three or four, all covered by the sheaths. *Leaves* long, slender, rigid, setaceous, frequently hairy on both sides. *Inflorescence* racemed, bursting from the upper sheath. *Spikelets* large, few, composed of two glumes and one floret. *Glumes* of nearly equal lengths, long, slender, furnished with a few long, scattered hairs, especially on the keels. *Floret* about half the length of the glumes, of two paleæ, the outer palea five-ribbed, hairy, and pointed at the base, terminating in a long feathery awn. Inner palea rather shorter than the outer, membranes acute. *Awn* arising from the very summit of the outer palea, and frequently more than twenty times the length of the palea, soft and feathery the whole length, except at the base, where it is twisted for about the space of an inch. *Styles* two, distinct. *Stigmas* feathery. *Filaments* three, capillary. *Anthers* notched at each end. *Scales* acute.

Obs.—This grass, which is so well known, on account of its beautiful feather-like appearance, is said to have been found wild on limestone rocks in the county of Westmorland. It is cultivated in gardens of the curious, and serves in winter as an ornament to our rooms.

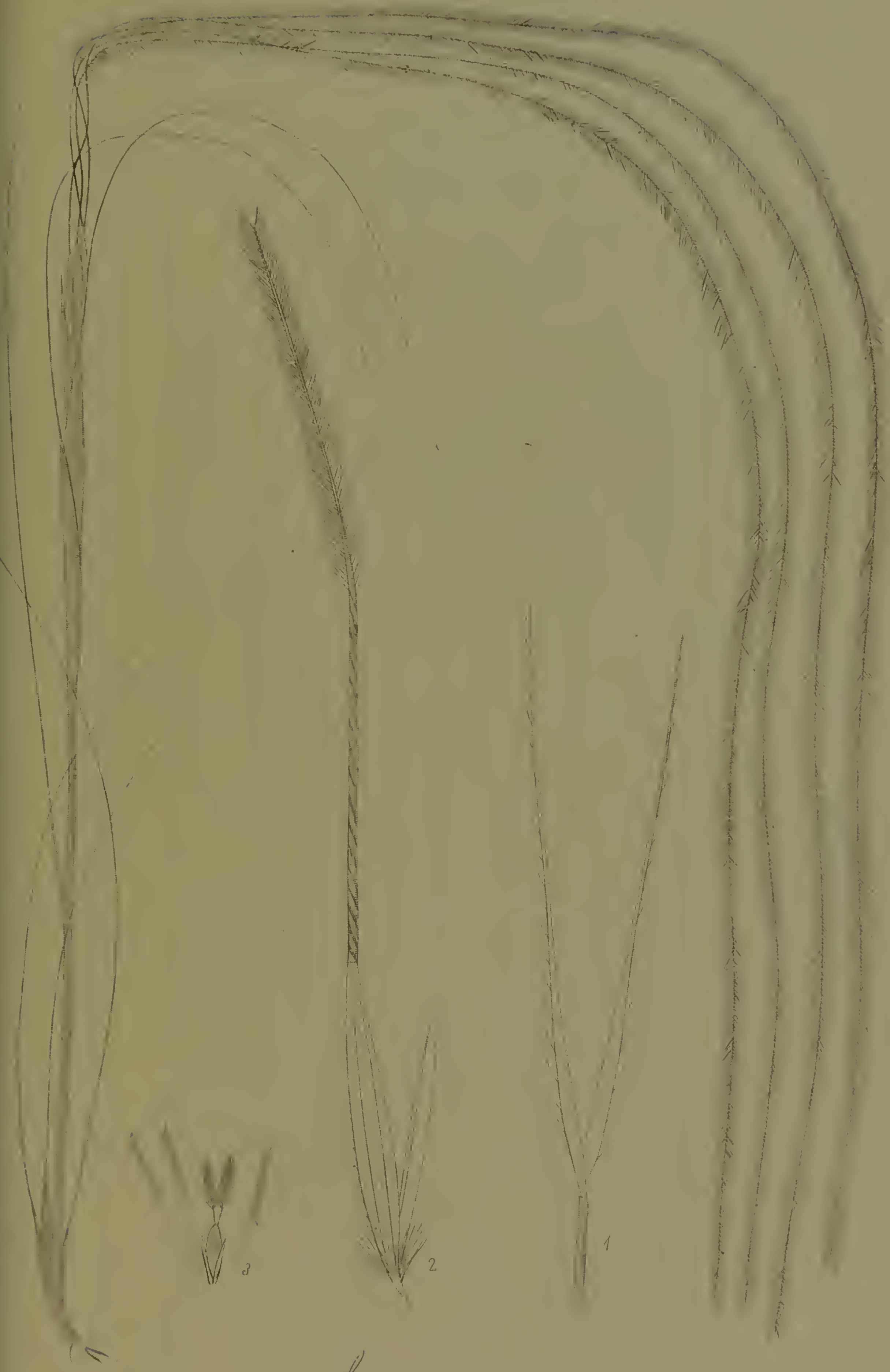
It grows wild in many places in Germany, in dry sandy situations. Its agricultural merits rank among the inferior grasses.

Flowers in the early part of August, and ripens its seed about the middle of September.

The accompanying figure was taken from a cultivated specimen.

Stipa pennata, Linn., Koch, Smith, Hooker, Knapp, Lind., Bab.

PLATE LXXXVII.



Stipa pennata

R. Parnell. M.D. delt et sculpt

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Explanation of Plate LXXXVII. *Stipa pennata,* natural size.

Fig. 1. Glumes. ⎫
2. Floret, showing the two paleæ. ⎬ Magnified.
3. Ovarium, pistils, and stamens. ⎭

LAGURUS OVATUS.

Hair's-tail-Grass.

Plate LXXXVIII.

Specific Character.—Outer palea terminating in two, slender, rough, bristles.

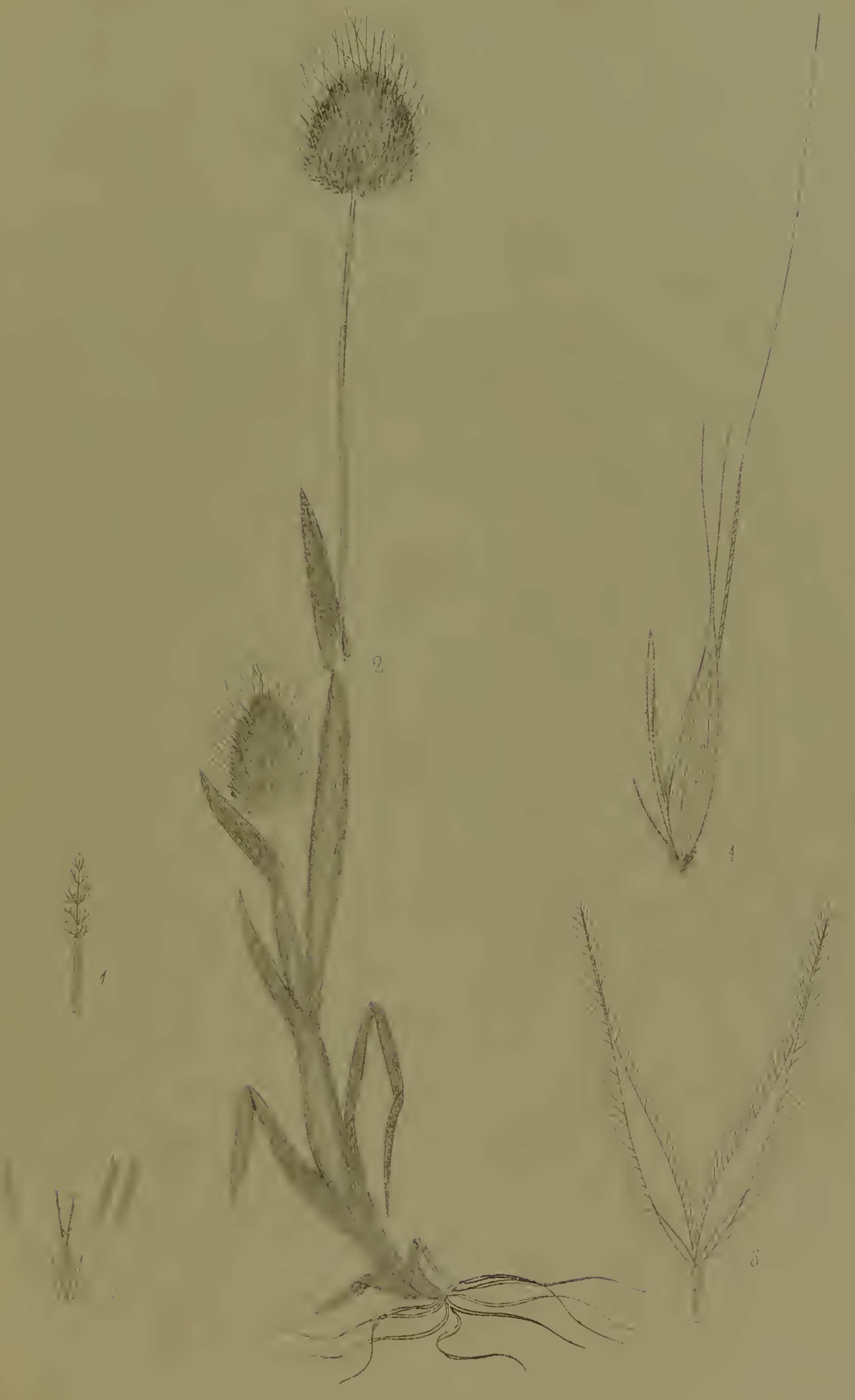
Description.—Root annual, fibrous. *Stem* erect, round, smooth, hollow and striated; from three to nine inches high; bearing four or five leaves with soft, downy, inflated sheaths; upper sheath longer than its leaf. *Ligule* prominent, obtuse, embracing the stem. *Joints* usually three, mostly covered by the sheaths. *Leaves* rather short, broad, flat, acute, covered on both surfaces with soft downy hairs. *Inflorescence* compound panicled, of an ovate form, usually about an inch in length, at first erect, at length bending slightly to a side, the branches short, numerous, clustered. *Spikelets* crowded, composed of two, long, hairy glumes and one floret. *Glumes* of equal lengths, fringed with long, soft, white hairs. *Floret* about one-third shorter than the glumes, of two paleæ, the outer palea rough, five-ribbed, hairy at the base, terminating in two, slender, rough bristles, and furnished with a long dorsal awn. Inner palea about the length of the outer, thin, narrow, and roughish on the lateral folds. *Awn* arising from a little below the bifid summit of the outer palea, and extending considerably beyond the palea, rough its whole length, and slightly bent a little below its centre. *Styles* two, very short. *Stigmas* feathery. *Filaments* three, slender. *Anthers* cloven at each end. *Scales* acute.

Obs.—The pale soft head of this grass is so striking a character, that it is not likely to be mistaken for any other British grass. I have known, however, some varieties of *Alopecurus pratensis* mistaken for it, but the form of the spikelets are totally different.

As a British grass it is very rare, found only on sandy ground in the north and west of Guernsey. It is also a native of Asia.

Lagurus ovatus, Linn., Koch, Kunth, Smith, Hooker, Bab., Lind., Knapp, With.

PLATE LXXXVIII.



Lagurus ovatus.

R. Parnell, M.D. delᵗ et sculpᵗ

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Flowers in June, and ripens its seed about the end of July. Of no agricultural use.

The accompanying figure was taken from specimens gathered in Guernsey.

Explanation of Plate LXXXVIII. *Lagurus ovatus*, natural size.

Fig. 1. Rachis and branches natural size.
2. Ligule natural size.
3. Spikelet showing the glumes and floret.
4. Floret showing the paleæ and awn.
5. Ovarium, pistils, and stamens.
Magnified.

POA BULBOSA.

Bulbous Meadow-Grass.

Plate LXXXIX.

Specific Character.—Florets webbed. Ligules long and acute. Stem and sheaths smooth.

Description.—Root perennial, bulbous. *Stem* round, smooth, hollow, and striated, from five to nine inches high, bearing four or five leaves, with smooth striated sheaths; the upper sheath much longer than its leaf. *Ligule* of upper sheath long and pointed, about twice as long as broad. *Joints* usually three, the upper situated below the centre of the stem, and frequently covered by the second sheath. *Leaves* flat, acute, roughish on the edges and inner surface, smooth behind. *Inflorescence* panicled, the branches rough, arising alternately on the rachis, generally in pairs. *Spikelets* ovate, green, or tinged with purple, composed of two glumes and three or four florets. *Glumes* about equal, three-ribbed, toothed on the upper half of the keels. *Florets* longer than the glumes, copiously webbed at the base, of two paleæ, the outer palea of lowermost floret five-ribbed; the dorsal and marginal ribs hairy, the intermediate ribs naked; the inner glume a very little shorter than the outer, thin, whitish, narrow, acute, furnished with two green ribs, minutely fringed. *Styles* two, distinct. *Stigmas* feathery. *Filaments* capillary, three. *Anthers* notched at each end. *Scales* acute, notched.

Obs.—*Poa bulbosa* belongs to that division of Poa in which the florets are webbed at the base.

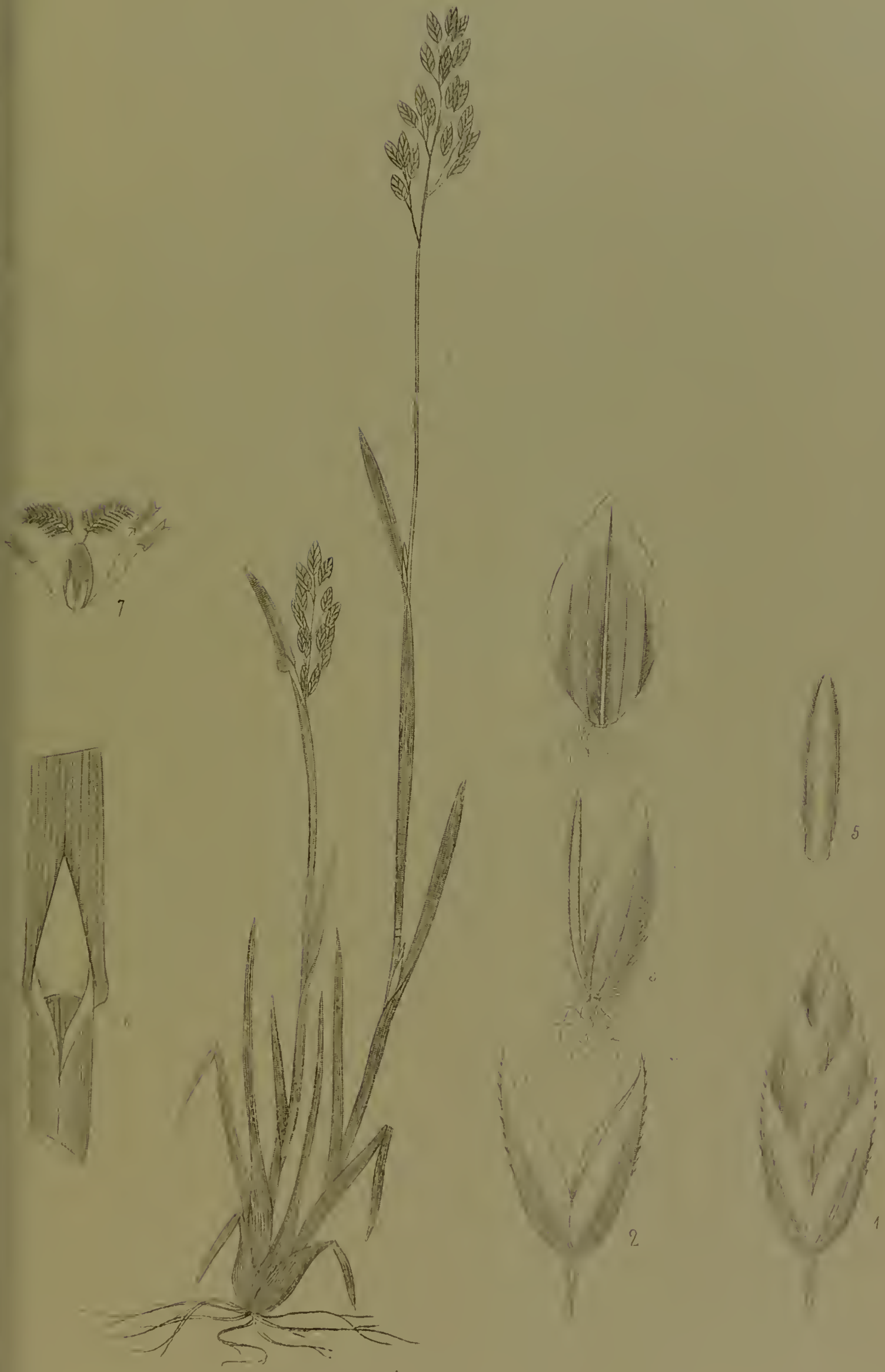
It is distinguished from *Poa pratensis* in the *ligules* being acute; *root* bulbous-like;—while in *Poa pratensis* the *ligules* are obtuse, and the *root* fibrous.

Poa bulbosa is distinguished from *Poa trivialis* in the *sheaths* being smooth; *marginal* ribs of outer palea hairy;—whereas in *Poa trivialis* the *sheaths* are rough, and the *marginal* ribs of the outer palea naked.

Poa bulbosa is distinguished from *Poa compressa* in the *ligules* being

Poa bulbosa, Linn., Kunth, Koch, Smith, Hooker, Knapp, With., Lind., Bab.

PLATE LXXXIX.



Poa bulbosa

[illegible]

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long and acute ;—while in *Poa compressa* the *ligules* are short and blunt. *Stem* very much compressed, and the root creeping.

This grass has not been found either in Scotland or Ireland, but grows abundantly in many places on the sandy shores on the south and east of England, especially near Yarmouth, where it forms a great part of the herbage of the Denes. It also grows plentifully at Lowestoff, Suffolk, on the low sandy ground between the middle part of the town and the beach. It is also a native of France, Germany, Spain, Portugal, Italy, Siberia, and North Africa.

It is an early grass, flowering in April and May, after which it soon withers, when the bulbs lie loose upon the sand until the autumn following, when they again fix themselves. For the purpose of agriculture, this grass possesses no superior merit beyond that of early growth, the quantity of herbage being scanty.

The accompanying figure was taken from a specimen gathered in Suffolk.

Explanation of Plate LXXXIX. *Poa bulbosa,* natural size.

Fig. 1. Spikelets, showing the two glumes and four florets.
2. Glumes.
3. Floret, showing the outer and inner palea, with a copious web at the base.
4. Outer palea opened, showing the five ribs, three of which are hairy.
5. Inner palea, showing the fringed marginal ribs.
6. Ligule of upper sheath long and pointed.
7. Ovarium, pistils, and stamens.

Magnified.

POA SUBCOMPRESSA.

Flat-stalked Five-ribbed Meadow-Grass.

Plate XC.

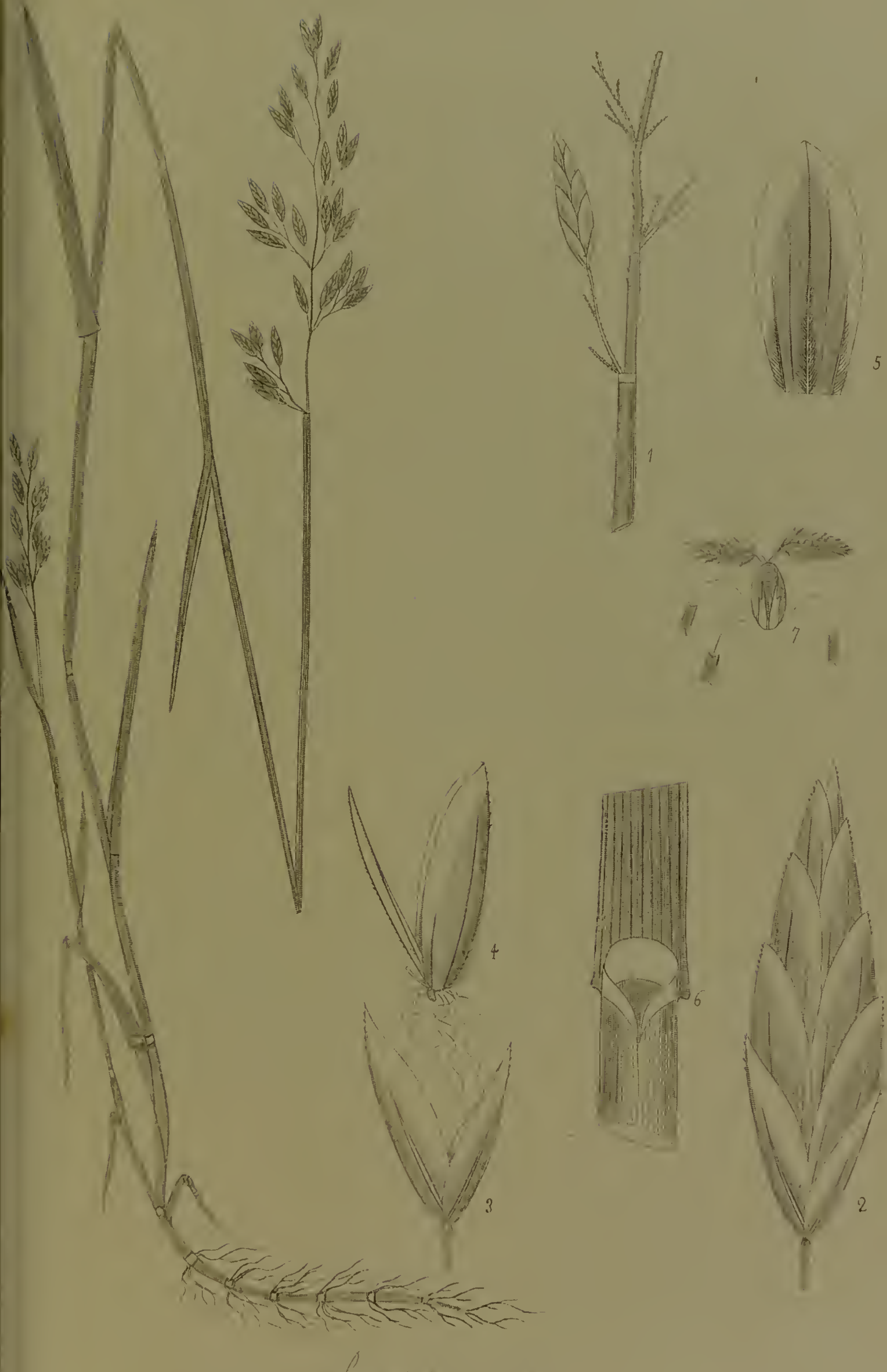
Specific Characters.—Florets webbed. Outer palea five-ribbed. Marginal ribs hairy. Stem very much compressed. Ligule obtuse.

Description.—Root perennial, creeping, producing stems from six to fifteen inches in length. *Stems* erect, decumbent at the base, smooth, hollow, very much compressed, bearing four or five leaves with smooth, striated, compressed sheaths; upper sheath about equal in length to its leaf. *Ligule* of upper sheath short and obtuse, about twice as long as broad. *Joints* four or five, the upper generally situated about the middle of the stem. *Leaves* rather short, flat, acute, rough on the upper surface and edges, smooth behind. *Inflorescence* simple panicled, spreading while in flower, otherwise close, the branches and rachis rough; lower part of the rachis much smaller than the stem. *Spikelets* ovate, acute, compressed, composed of two glumes and from five to seven florets, the summit of the lowermost floret extending slightly beyond the large glume. *Glumes* rather unequal, three-ribbed, minutely toothed on the upper part of the keels. *Florets* of two paleæ, the outer palea of the lowermost floret five-ribbed; the lower half of the dorsal and marginal ribs hairy; the base, furnished with a delicate web, attached to the glumes. Inner palea rather shorter than the outer, with two green ribs minutely fringed. *Styles* two, distinct. *Stigmas* feathery. *Filaments* three, capillary. *Anthers* notched at each end. *Scales* acute, notched.

Obs.—Poa subcompressa very much resembles *Poa compressa,* but is readily distinguished in the *outer* palea having five distinct ribs instead of only three. When under cultivation the panicle does not grow to half the size of that of *Poa compressa.*

Poa subcompressa is distinguished from *Poa polynoda* in the *florets* being distinctly webbed, and the *ligules* shorter and more obtuse;—while in *Poa polynoda* the florets are never webbed.

Poa subcompressa is distinguished from *Poa pratensis* in the *sheaths* being very much compressed, nearly flat; *upper* leaf about equal



Poa subcompressa

in length to its sheath;—whereas in *Poa pratensis* the sheaths are not compressed, and the *upper* leaf is much shorter than its sheath.

Poa subcompressa is distinguished from *Poa nemoralis* in the *panicle* being much shorter and more rigid. *Ligules* more prominent. *Sheaths* considerably more compressed. *Upper* leaf not longer than its sheath;—whereas in *Poa nemoralis* the *panicle* is long and slender, *ligules* very short, and the *upper* leaf longer than its sheath.

This grass grows, though sparingly, in the neighbourhood of Edinburgh, on dry sandy soil and rocky places, and on the tops of old walls. It has been gathered by Professor Balfour in the King's Park, and Mr Babington has sent me specimens gathered in Monmouthshire. I have met with it growing in many places on old walls near Paris, and I have also found it very common at Aix-la-Chapelle, Coblentz, Ratisbon, and Vienna. It flowers early in July, and ripens its seed in the middle of August. It is a grass of not sufficient agricultural importance to merit the attention of farmers.

The accompanying figure was taken from a specimen gathered near Edinburgh.

Explanation of Plate XC. *Poa subcompressa*, natural size.

Fig. 1. Part of the rachis and branches.
2. Spikelet, showing the two glumes and seven florets.
3. Glumes.
4. Floret, showing the two paleæ, and a delicate web from the base, attached to the glumes.
5. Outer palea opened, showing the five ribs, three of which are hairy.
6. Ligule of upper sheath.
7. Ovarium, pistils, stamens, and scales.

Magnified.

POA POLYNODA.

Silicious Meadow-Grass.

Plate XCI.

An additional figure of this grass is here given, in order to delineate the species more minutely than that in Plate XXXIX.

The description will be found in page 85.

From the time I first discovered this plant, specimens have been under cultivation in rich soil, and plants have been reared from seeds sown in pots; no change whatever has taken place in the character of the grass further than that of the panicle becoming more luxuriant;—the essential characters remaining constant, namely, *florets* not webbed; *outer palea* five-ribbed; *ligules* prominent; *upper leaf* about equal in length to its sheath; and the *stem* and *sheaths* much compressed. I consider it a well-marked species.

Specimens of this grass are under cultivation in Mr Lawson's nursery gardens, Edinburgh.

Explanation of Plate XCI. *Poa polynoda,* natural size.

Fig. 1. Part of the rachis and branches.
2. Spikelet, showing the two glumes and four florets.
3. Glumes.
4. Floret showing the two paleæ.
5. Outer palea, showing the five ribs, the middle and two lateral ones hairy.
6. Ligule of upper sheath.
7. Ovarium, pistils, stamens, and scales.

Magnified.

POA POLYNODA (variety) DENTICULATA.

Lyle's Silicious Meadow-Grass.

Plate XCII.

This grass differs from the preceding in the middle rib of the outer palea not being hairy, but mintuely toothed the whole length. *Ligule* of upper sheath shorter. Base of the floret often furnished with a single convoluted hair. In other respects the two plants are similar.

This variety was gathered by Mr Lyle near Airth, Stirlingshire.

Flowers in the first week in July, and ripens its seed early in August. Of little agricultural importance, the foliage being too scanty.

Explanation of Plate XCII. *Poa polynoda* (variety) *denticulata*, natural size.

Fig. 1. Part of the rachis and branches.
2. Spikelet, showing the two glumes and three florets.
3. Glumes.
4. Floret, showing the two paleæ ; the large palea toothed the whole length of the dorsal rib, and furnished with a small convoluted hair at the base.
5. Outer or large palea opened, showing the five ribs ; the side ribs slightly hairy on the lower half.
6. Ligule of the upper sheath.
7. Ovarium, pistils, stamens, and scales.

Magnified.

Poa Parnellii.

Babington's Meadow-Grass.

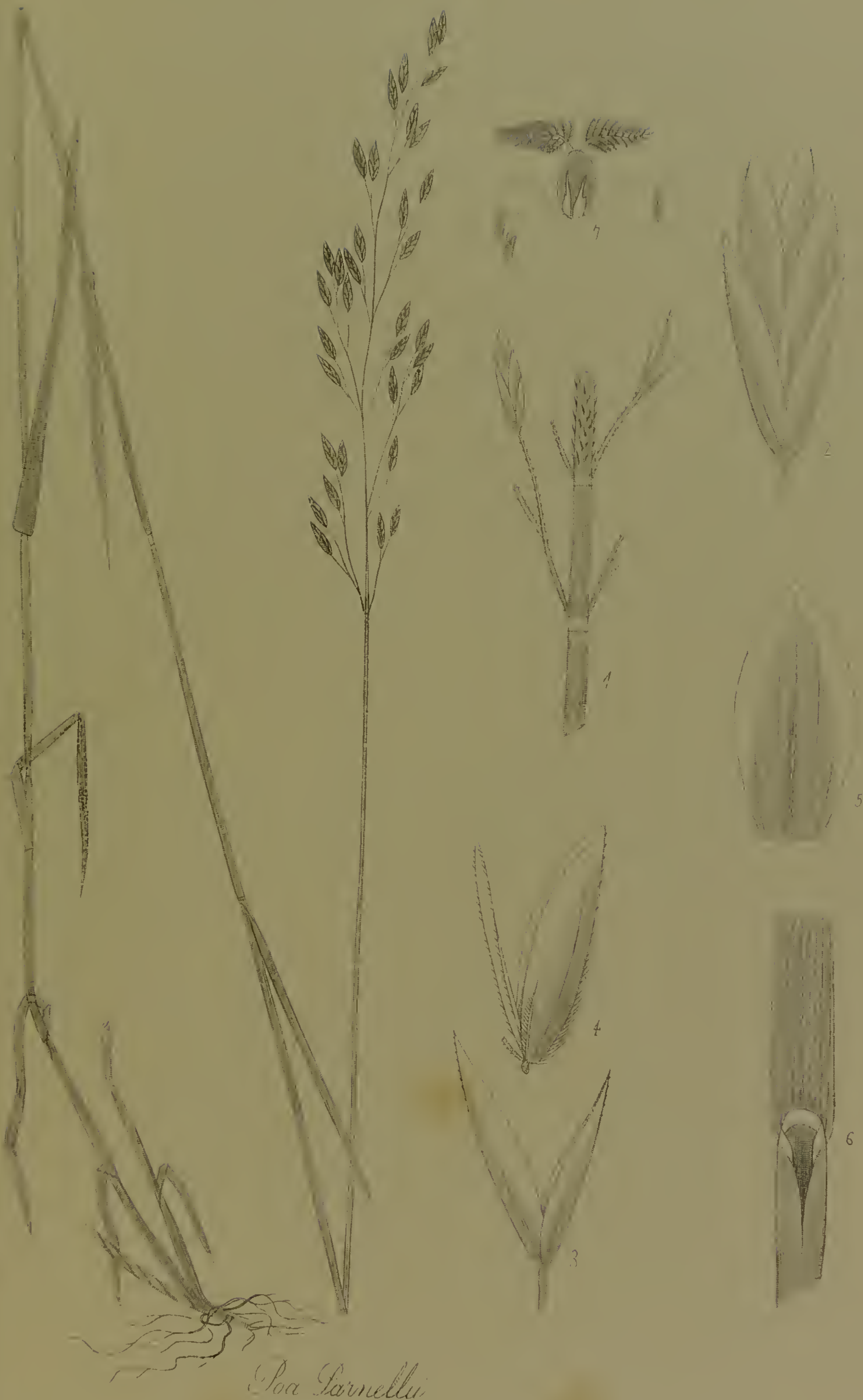
Plate XCIII.

Specific Characters.—Florets not webbed. Ligule very short, obtuse. Upper leaf shorter than its sheath. Outer palea five-ribbed. Upper joint about the middle of the stem.

Description.—Root perennial, fibrous, producing stems from six to eighteen inches in length. *Stems* erect, compressed, smooth and somewhat polished, bearing four or five leaves with smooth, striated sheaths ; the upper sheath longer than its leaf. *Ligule* of upper sheath very short and obtuse, about six times as broad as long. *Joints* four, the upper one naked, stiuated about the middle of the stem, and very remote from the second. *Leaves* lanceolate, flat, acute, rough on the upper surface and edges, smooth behind on the lower half. *Inflorescence* compound panicled, usually about three inches in length, erect, rather close, the branches slender, rough, the lower ones arising from the rachis mostly in pairs or threes ; the rachis on the lower part scarcely smaller than the stem, smooth, the upper part rough. *Spikelets* ovate-lanceolate, composed of two glumes and two or three florets, the summit of the lowermost floret extending a little beyond the apex of the large glume. *Glumes* unequal, acute, three-ribbed, the dorsal rib minutely toothed on the upper third. *Florets* of two paleæ, not webbed, the outer palea of lowermost floret five-ribbed, the dorsal and marginal ribs hairy on the lower half, the one on each side of the dorsal very indistinct, not hairy, (best seen when the palea is opened and held between the lens and light). Inner palea about equal in length to the outer, with two green ribs minutely fringed. Pedicle of second floret roughish on one side. *Filaments* three. *Anthers* notched at each extremity. *Ovarium* obovate. *Styles* two, distinct. *Stigmas* feathery.

Obs.—Poa Parnellii is more closely allied to *Poa polynoda* than to any other of the British *Poas.* It is, however, distinguished from *Poa polynoda* in the *ligule* being much shorter and more obtuse, and about six times as broad as long, (Fig. 6) ; *lower* part of the rachis

Poa Parnellii, Babington's Manual of British Botany.



Poa Parnellii

R. Parnell M.D. del.t et sculp.t

[illegible]

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scarcely smaller than the stem, (Fig. 1) ; *upper* sheath longer ; *panicle* larger and more lax; *ribs* of the outer palea less perceptible. *Glumes* more acute ; *spikelets* fewer, flowered ;—whereas in *Poa polynoda* the *ligule* is prominent, rounded at the summit, and about twice as broad as long; *lower* part of the rachis much smaller than the stem ; *upper* sheath about as long as its leaf; *panicle* small and contracted ; *ribs* of outer palea more distinct ; *glumes* broader, and nearly of equal size; *spikelets* four or five, flowered.

Poa Parnellii is distinguished from *Poa nemoralis* in the *florets* not being webbed; *upper* sheath longer than its leaf;—whereas in *Poa nemoralis* the *florets* are distinctly webbed, and the *upper* sheath is shorter than its leaf.

Poa Parnellii is distinguished from *Poa Balfouri* in the *florets* not being webbed. *Upper* joint situated about the middle of the stem. *Ligule* short and blunt, about six times as broad as long;—whereas in *Poa Balfouri* the *florets* are distinctly webbed. *Joints* situated far below the centre of the stem. *Ligule* prominent, blunt, about as long as broad.

This grass was discovered by Mr Babington, about two years ago, at High-force in Teesdale, growing in sheltered and rocky situations.

It has since been found in other parts of England. Its agricultural merits probably rank with *Poa nemoralis.*

Flowers in July.

Explanation of Plate XCIII. *Poa Parnellii*, natural size.

Fig. 1. Part of the rachis and branches.
2. Spikelet, showing the two glumes and three florets.
3. Glumes.
4. Floret, showing the two paleæ.
5. Outer palea opened, showing the five ribs.
6. Ligule of upper sheath.
7. Ovarium, pistils, stamens, and scales.

Magnified.

Poa alpina (variety) vivipara.

Viviparous Alpine Meadow-Grass.

Plate XCIV.

This variety is frequent on most of the lofty mountains in Scotland, Ireland, and Wales, growing on the ridges of wet rocks, usually at an elevation of about 3600 feet above the level of the sea. The principal mark of distinction in this variety rests on the transformation of the inner palea into leaves.

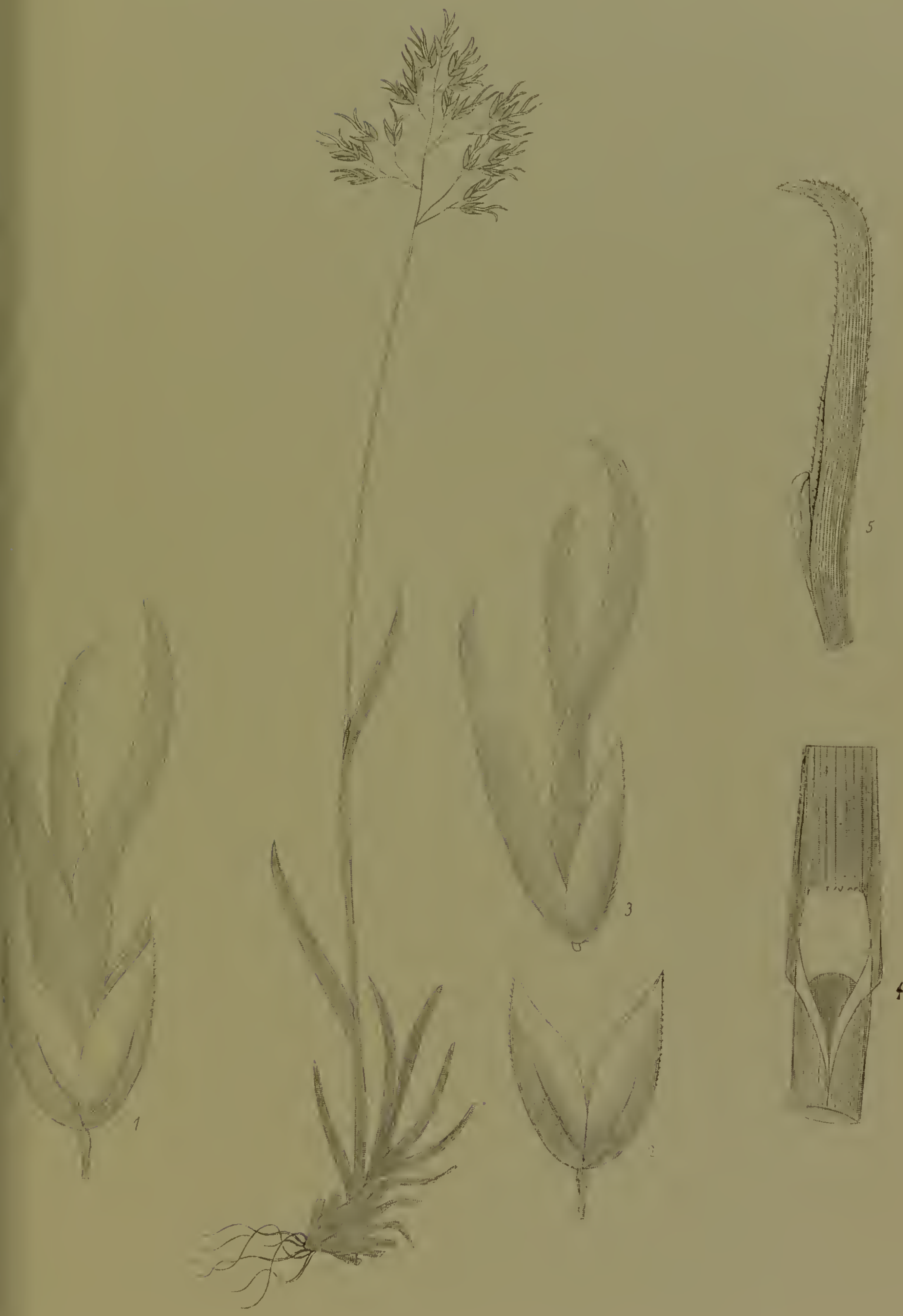
The only plant it is likely to be mistaken for is *Poa laxa*, figured in Plate XXXVIII.; from which it differs in the whole plant being stouter. Root tufted. Glumes rounded at the base. Leaves broader, shorter, more linear, folded and rounded at the summit, and terminating in a minute mucro;—whereas in *Poa laxa* the whole plant is more slender. Root not tufted. Glumes forming an obtuse angle at the base. Leaves flat, lanceolate, and acute.

Poa laxa was formerly considered to be a very rare British grass, found only on Ben Nevis. Professor Balfour, however, has recently discovered it growing plentifully on the rocks at Lochnagar, where he gathered nearly a hundred specimens, both in the natural and viviparous state.

Explanation of Plate XCIV. *Poa alpina* (variety) *vivipara*, natural size.

Fig. 1. Spikelet, showing the two glumes and florets.
2. Glumes.
3. Florets in a viviparous state, the inner palea and upper florets transformed into leaves.
4. Ligule of upper sheath.
5. Upper leaf, showing the blunt ligule and rounded summit; the back and margins minutely toothed.

Magnified.



Poa alpina (var.) vivipara

Parnell M.D. del.

Printed by Gellatly.

Published by Wm Blackwood & Sons, Edinburgh & London.

POA FLUITANS (variety) SUBSPICATA.

Spike-like Floating Meadow-Grass.

Plate XCV.

This variety is distinguished from *Poa fluitans,* figured in Plate XLV. in the leaves being narrower and more acute; the inflorescence of a spike-like form and the anthers more than double the size. It is a frequent grass in Scotland, growing in moist ground of the richest kind, principally in meadows. It delights in the margins of pools and in slow-running streams, and frequently forms a portion of the best pasturage for cows.

Care must be taken not to confound this grass with *Bucetum loliaceum* (variety) *elongatum,* figured in Plate CXIV. to which it bears a great resemblance, and is frequently found in the same situations. It is, however, very easily distinguished by the *long ligule* of the upper sheath, (Fig. 6,) and the *outer* palea with seven ribs minutely toothed, (Fig. 4);—while in *Bucetum loliaceum* (variety) *elongatum,* the *ligule* is very short, (Fig. 5,) and the *outer* palea has but five ribs, smooth, (Fig. 3.) It is also distinguished from *Lolium perenne* by the same characters, and in having two glumes instead of only one.

The accompanying figure was drawn from a specimen gathered near Killin, Perthshire.

Flowers in the second week of July, and ripens its seed about the end of August.

Explanation of Plate XCV. *Poa fluitans* (variety) *subspicata,* natural size.

Fig. 1. Spikelet, showing the two glumes and eleven florets.
2. Glumes very unequal.
3. Floret, showing the outer and inner paleæ.
4. Outer palea opened, showing the seven rough ribs.
5. Inner palea minutely fringed at the margins and cloven at the summit.
6. Upper leaf folded, showing the long acute ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.

POA DISTANS (variety) OBTUSA.

Babington's Meadow-Grass.

Plate XCVI.

This unusual variety of *Poa distans* I received from Mr Babington, who gathered it at Breeden, Leicestershire, where it grows in great quantity and is annually cut for hay. It differs in some respects from the more common form of *Poa distans,* as figured in Plate XLI., viz. in the spikelets being larger, the ligules shorter, and the outer palea broader and more obtuse; and in case it might hereafter be considered as a distinct species, I have deemed it necessary to give a full description of the whole plant.

Description.—Root perennial, fibrous, producing several stems from three to fifteen inches in length. *Stems* erect, compressed, smooth, striated, and polished, bearing four or five leaves with smooth striated sheaths, upper sheath much longer than its leaf. *Ligule* of upper sheath short and obtuse, about one-third as long as broad. *Joints* four, mostly covered by the sheaths, the upper joint situated about the middle of the stem. *Leaves* short, smooth behind, rough on the inner surface, with eight or nine prominent ribs, the margins mostly involute when dry. *Inflorescence* compound panicled, rather close; rachis and branches strongly grooved, rough to the touch, the branches arising from the lower half of the rachis in threes or fives. *Spikelets* linear, composed of two glumes and about seven florets. *Glumes* unequal, obtuse, membranous at the margins, slightly three-ribbed, the outer glume much the smaller. *Florets* of two paleæ, outer palea of lowermost floret about one-fourth longer than the large glume, obtuse, the back straight, slightly hairy at the base, five-ribbed, the ribs prominent, the middle one not reaching to the top. Inner palea rather shorter than the outer, with two green ribs delicately fringed. *Styles* two, distinct, very short. *Stigmas* feathery. *Filaments* three. *Anthers* notched at each end. *Scales* acute.

Obs.—This plant is distinguished from *Poa maritima* in the *ligule* being shorter and more obtuse; *outer* palea broader and more obtuse; the *ribs* of the upper leaf more numerous and distinct; and the *anthers* about one-third of the size.

It is likewise distinguished from *Poa Borreri* in the *spikelets* being larger, the *panicle* not so much contracted, and the outer palea considerably more obtuse.

These characters, although not very prominent, are quite sufficient to distinguish the species.

Explanation of Plate XCVI. *Poa distans* (variety) *obtusa*, natural size.

Fig. 1. Spikelet, showing the two glumes and seven florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea opened, showing the five ribs and obtuse summit.
5. Ligule of upper sheath.
6. Ovarium, pistils, stamens, and scales.

Magnified.

POA DISTANS (variety) MINOR.

Babington's Reflex Meadow-Grass.

Plate XCVII.

This variety seems to be the same as the preceding, differing only in being of smaller growth, with spikelets of fewer florets. It was gathered at Breeden by Mr Babington, who sent me specimens, from which the accompanying figure was taken.

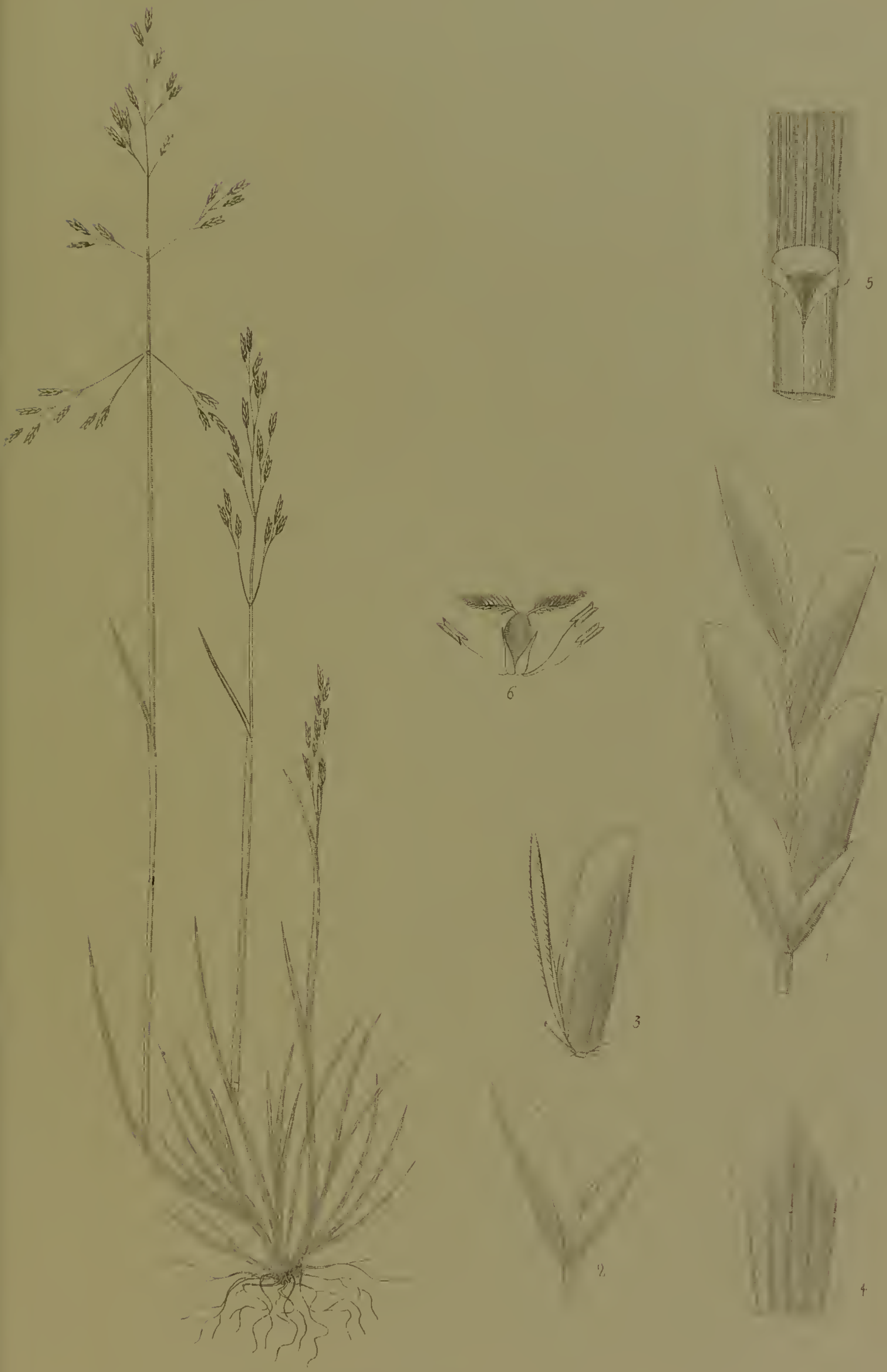
Flowers in July.

Explanation of Plate XCVII. *Poa distans* (variety) *minor*, natural size.

Fig. 1. Spikelets, showing the two glumes and four florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea opened, showing the five ribs and obtuse summit.
5. Ligule of upper sheath.
6. Ovarium, pistils, stamens, and scales.

} Magnified.

PLATE XCVII.



Poa distans var. β minor

Parnell M.D. delt et sculpt [illegible]

Published by Wm Blackwood [illegible]

POA BORRERI.

Borrerian Meadow-Grass.

Plate XCVIII.

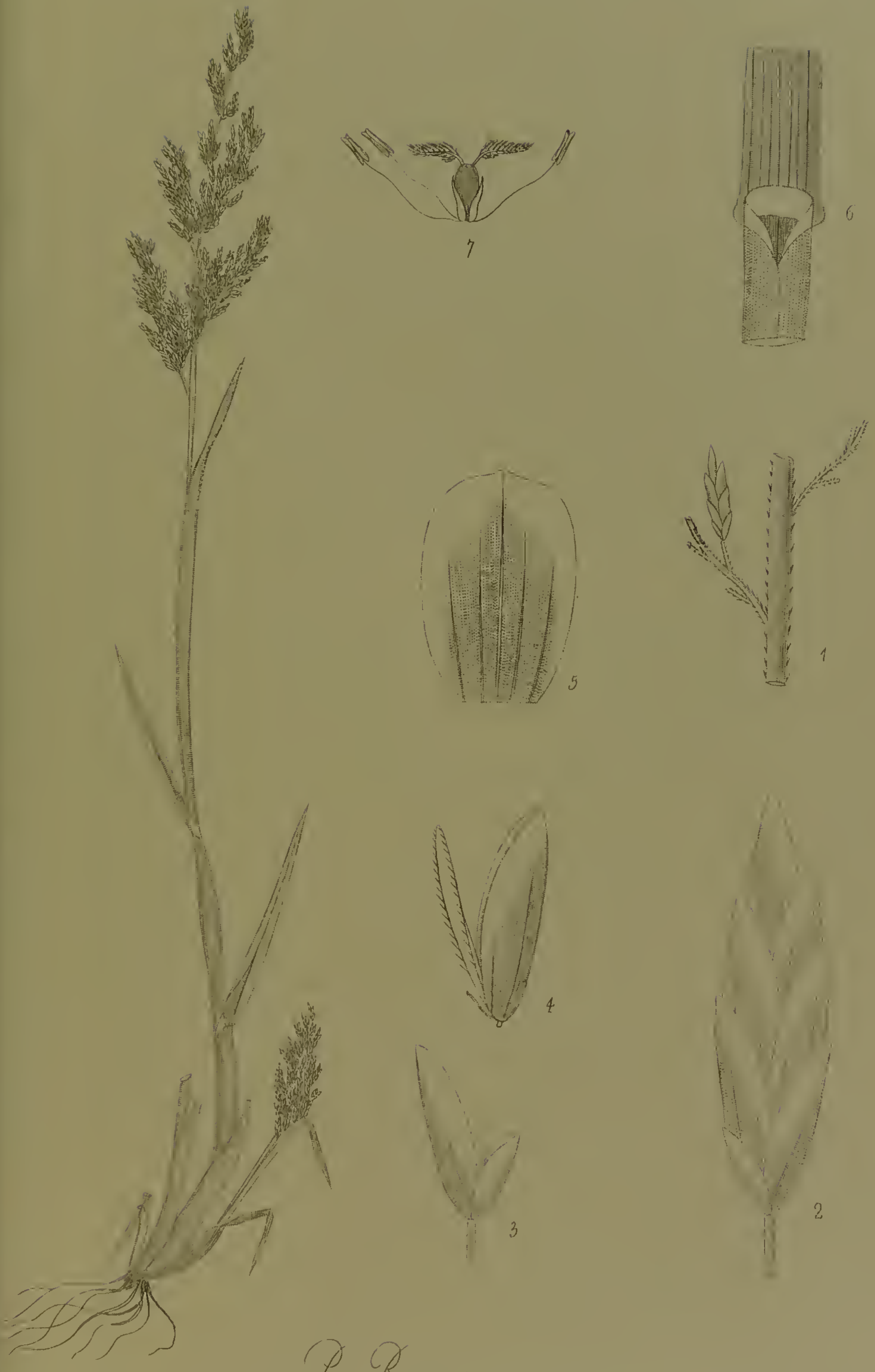
Specific Characters.—Branches and rachis rough. Ligule obtuse. Ribs of florets not prominent. Florets five-ribbed. Branches of panicle erect. Florets not webbed.

Description.—Root annual, fibrous, producing stems from three to eight inches in length. *Stems* more or less prostrate, slightly compressed, smooth, hollow, striated, and polished, bearing three or four leaves with smooth, striated sheaths; the upper sheath much longer than its leaf. *Ligule* of upper sheath short and blunt, the length about equal to half the breadth. *Joints* usually two, covered by the sheaths, situated near the base of the stem. *Leaves* short, rough on both surfaces except on the lower half of the outer surface, the margins involute, especially when dry. *Inflorescence* on the upper part racemed, on the lower simple and compound panicled, the branches arising from the rachis alternately, mostly in pairs of unequal lengths, seldom spreading, never deflexed; the rachis and branches rough, with minute teeth directed upwards. *Spikelets* situated in front of the rachis, somewhat linear, composed of two glumes and four or five florets, the summit of lowermost floret extending beyond the large glume. *Glumes* unequal, obtuse, membranous at the margins; outer glume the smaller, without lateral ribs; inner glume three-ribbed, the ribs not prominent. *Florets* of two paleæ; outer palea of lowermost floret five-ribbed, the middle rib extending to the summit. Inner palea rather shorter than the outer, with two green ribs delicately fringed. The whole plant presents a rigid, glaucous, compact appearance.

Obs.—*Poa Borreri* is so closely allied to *Poa procumbens* that it is difficult to point out a good specific character to distinguish them; yet, at the same time, I believe the two plants to be perfectly distinct; the only distinguishable character, however, being, that in *Poa Borreri* the *spikelets* are about half the size, of a less linear form, and the *ribs* of the florets less prominent.

Sclerochloa Borreri, Babington.

PLATE XCVIII.



Poa Borreri

Parnell M.D. del^{t} et sculp^{t}

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Poa Borreri is distinguished from *Poa maritima* in the *spikelets* not being half the size; *panicle* more rigid and compact; and the *ligule* shorter and more blunt.

Poa Borreri is distinguished from *Poa distans* in the *panicle* being more rigid and compact; the *branches* never deflexed; and the middle rib of the florets reaching to the summit.

Mr Babington, in a supplement to Sowerby's English Botany, t. 2797, has figured and described this grass, but the figure does not appear to be very characteristic of the plant. He states that it is far from being uncommon on the English coast, having been gathered by Mr Borrer at Gosport, Selsea, Southampton, Stokes Bay, Shoreham, and Freshwater in the Isle of Wight. Mr Babington has noticed it at Harwich, and on the Canvey Isle, near the mouth of the Thames. It is found mostly in brackish ditches, often in company with *Poa procumbens.*

Flowers in July.

May not this plant prove to be *Glyceria festucaeformis*, as described in Koch's *Synopsis Floræ Germanicæ?* "panicula æquali patente, *ramis fructiferis erecto-patulis,* spiculis 5–9 floris, *floribus lineari-oblongis*, obtusis breviterque apiculatis, *obsolete 5-nerviis,* radice fibrosa."

The accompanying figure was taken from a specimen gathered at Southampton.

Explanation of Plate XCVIII. *Poa Borreri,* natural size.

Fig. 1. Part of the rachis and branches.
2. Spikelet, showing the two glumes and five florets.
3. Glumes very unequal.
4. Floret, showing the two paleæ.
5. Outer palea, showing the five ribs, with the middle rib extending to the summit.
6. Ligule of upper sheath.
7. Ovarium, pistils, stamens, and scales.

Magnified.

POA MARITIMA (variety) HISPIDA.

Rough Sea Meadow-Grass.

Plate XCIX.

This variety is distinguished from *Poa maritima*, figured in Plate XLII., in the stem being compressed, the rachis furrowed on one side, and the branches rough with small tooth-like bristles. In other respects the two plants are nearly similar.

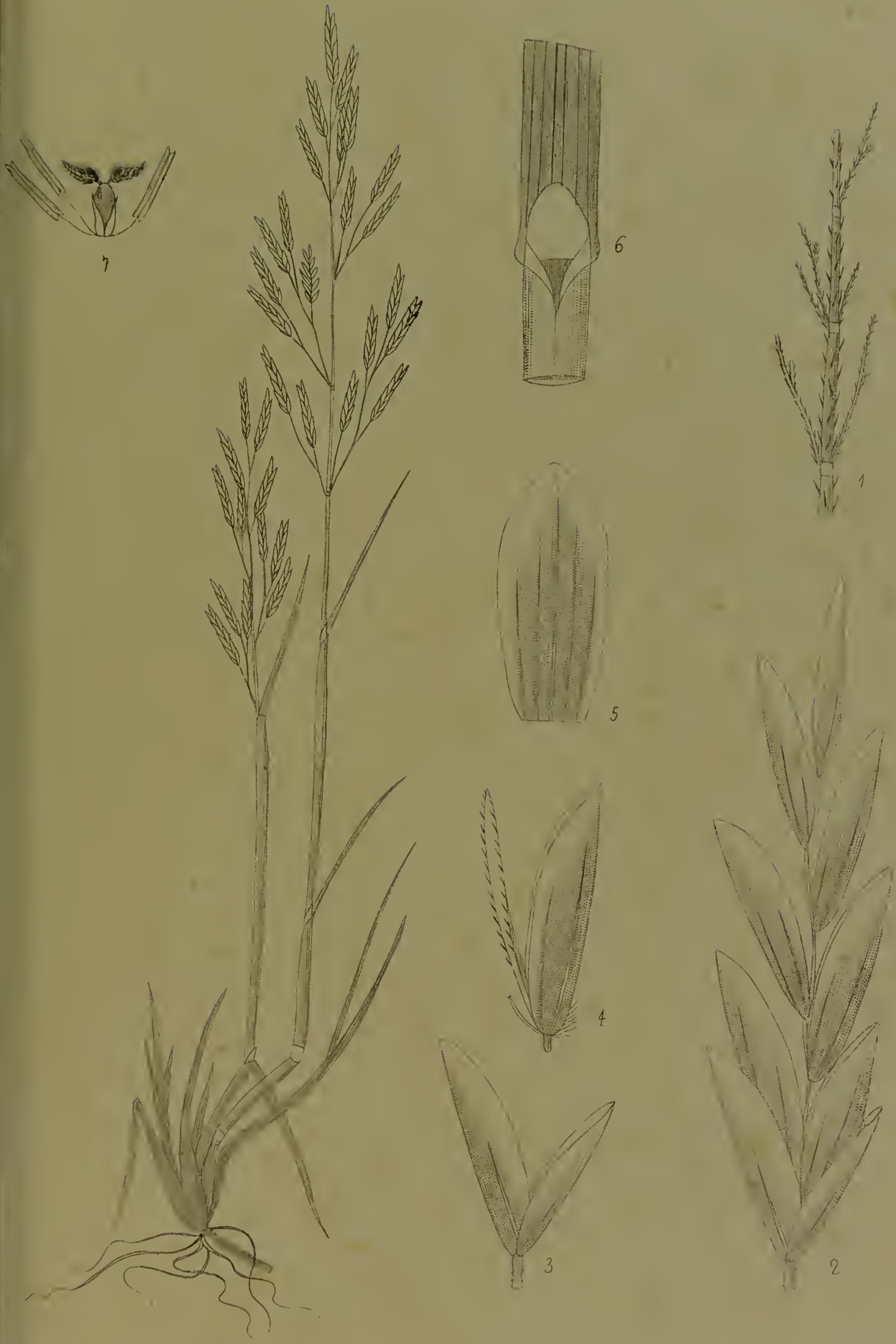
This grass was sent me by Mr Babington, who gathered it in Suffolk, and who justly considers it to be the *Sclerochloa maritima*, described by Fries.

Explanation of Plate XCIX. *Poa maritima* (variety) *hispida*, natural size.

Fig. 1. Rachis and branches, showing the tooth-like bristles.
2. Spikelet, showing the two glumes and seven florets.
3. Glumes.
4. Floret, showing the two paleæ.
5. Outer palea, showing the five ribs, with the middle rib extending to the summit.
6. Ligule of the upper sheath, and ribs of the leaf, four of which are but faintly marked, the central rib being very distinct, with a deep groove on each side.
7. Ovarium, pistils, stamens, and scales.

Magnified.

PLATE XCIX.



Poa maritima (variety) hispida

arnell, M.D. del. et sculp.

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Poa sylvatica (variety) subaristata.

Wood-Reed Meadow-Grass.

Plate C.

This variety is distinguished by the middle rib of the outer palea extending to or a little beyond the summit, in the form of a rough point or very short awn. In other respects it is similar to *Poa Sylvatica,* described in page 99.

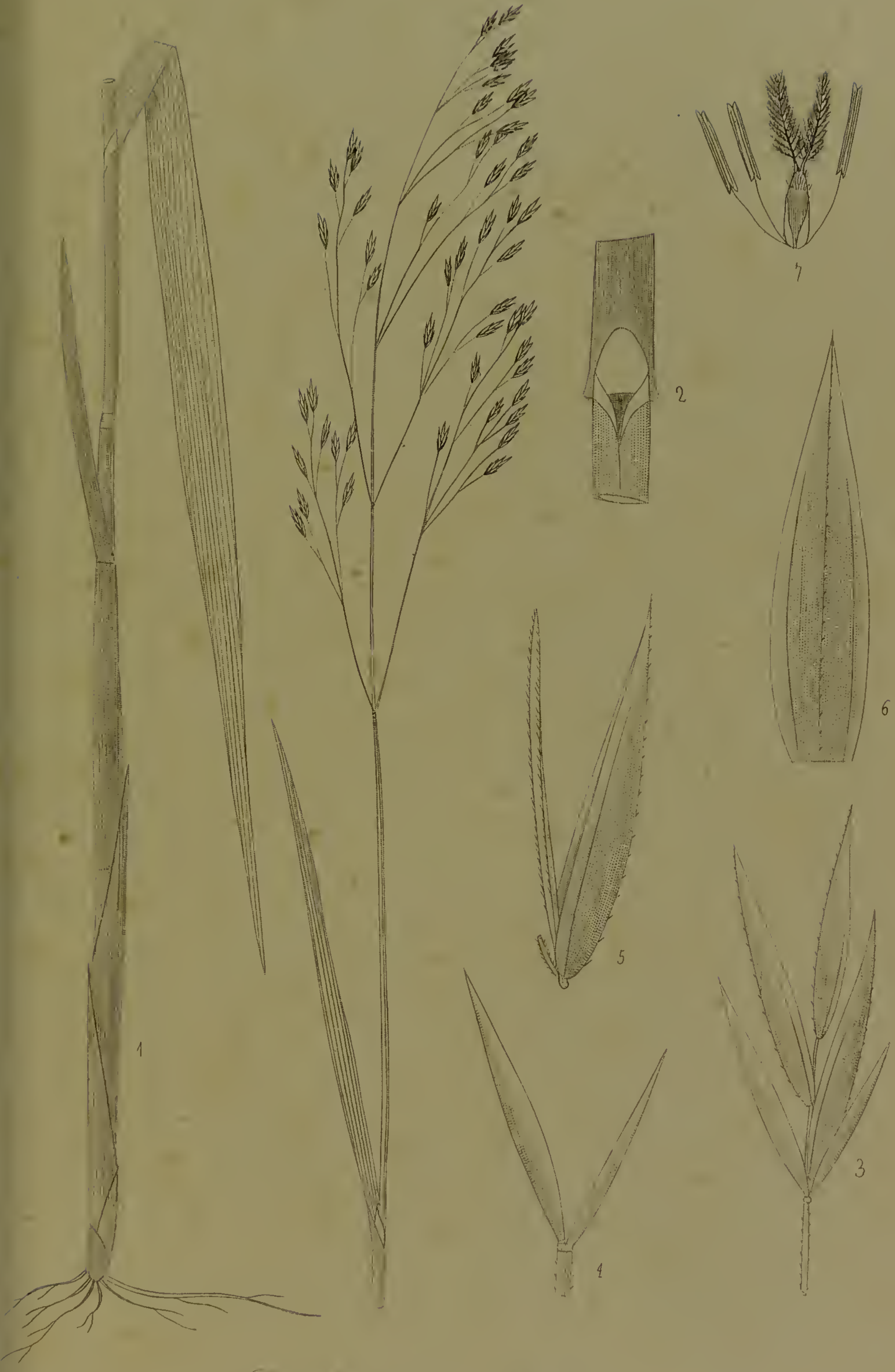
It is found in damp woods of rich soil in mountainous districts of England, Ireland, and Scotland. Flowers in the middle of July, and ripens its seed in the second week of August. The seeds, when mature, become very deciduous.

The accompanying figure was drawn from a specimen gathered near Killin, Perthshire.

Explanation of Plate C. *Poa Sylvatica* (variety) *subaristata*, natural size.

Fig. 1. Scales at the base of the stem peculiar to this species.
2. Ligule of upper sheath.
3. Spikelet, showing the two glumes and three florets.
4. Glumes.
5. Floret, showing the two paleæ.
6. Outer palea, showing the three ribs, the middle rib extending to or beyond the summit, and toothed the whole length.
7. Pistils, stamens, scales, and hairy ovarium.

Magnified.



Poa sylvatica (variety) subaristata

R. Parnell, M.D. del^{t} et sculp^{t}

Printed by J. Gellatly.

Published by W^{m} Blackwood & Sons Edinburgh & London.

BRIZA MINOR.

Small Quaking-Grass.

Plate CI.

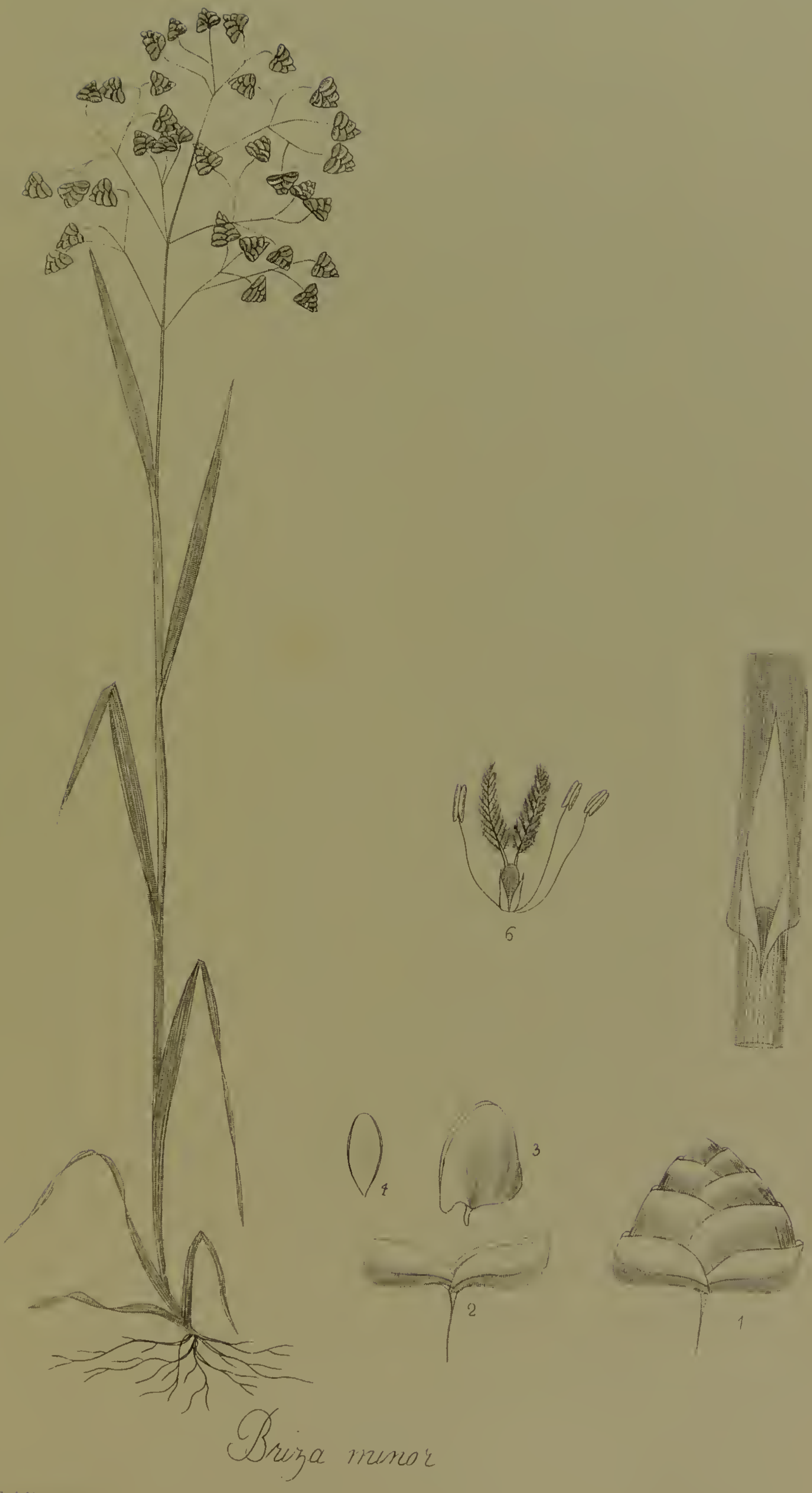
Specific Character.—Ligule lanceolate.

Description.—Root annual, fibrous, producing stems from four to six inches in length. *Stems* hollow, smooth, round, bearing five or six leaves with smooth, striated sheaths; the upper sheath longer than its leaf. *Ligule* of upper sheath lanceolate, about three times as long as broad. *Joints* usually five, the upper situated about the centre of the stem and generally covered by the sheath. *Leaves* flat, acute, slightly roughish on both surfaces, the margins minutely toothed. *Inflorescence* compound panicled, the branches roughish, slender, elegantly divaricated, arising from the rachis mostly in pairs. *Spikelets* compressed, of a triangular form, variegated with green and white, and sometimes purple, composed of two glumes and five or six florets. *Glumes* equal, membranous at the margins, three-ribbed, broad and obtuse. *Florets* of two unequal paleæ; the outer palea of lowermost floret broad, obtuse, strikingly gibbous behind, membranous at the margins, lobed at the base in front, without lateral ribs. Inner palea thin, flat, and furnished with two broad, green ribs. *Styles* two, distinct. *Stigmas* feathery. *Filaments* three, slender. *Anthers* notched at each end. *Scales* two, acute.

Obs.—Briza minor is distinguished from *Briza media* in the *ligule* being long and pointed; *glumes* longer than the lowermost floret;—while in *Briza media* the *ligule* is short and blunt, and the *glumes* shorter than the lowermost floret.

This is a very rare grass, found growing in dry sandy fields in the extreme south of England. It is also met with in Guernsey and Jersey, as well as in France, Germany, Switzerland, Italy, Portugal, Spain, Turkey, Greece, and North Africa.

Briza minor, Linn., Hooker, Smith, Bab., With., Koch, Kunth. *Briza aspera*, Knapp.



Briza minor

R. Parnell. M.D. del.t et sculp.t

Printed by J. Gellatly.

Published by Wm Blackwood & Sons. Edinburgh & London.

CATABROSA AQUATICA (variety) LITTORALIS.

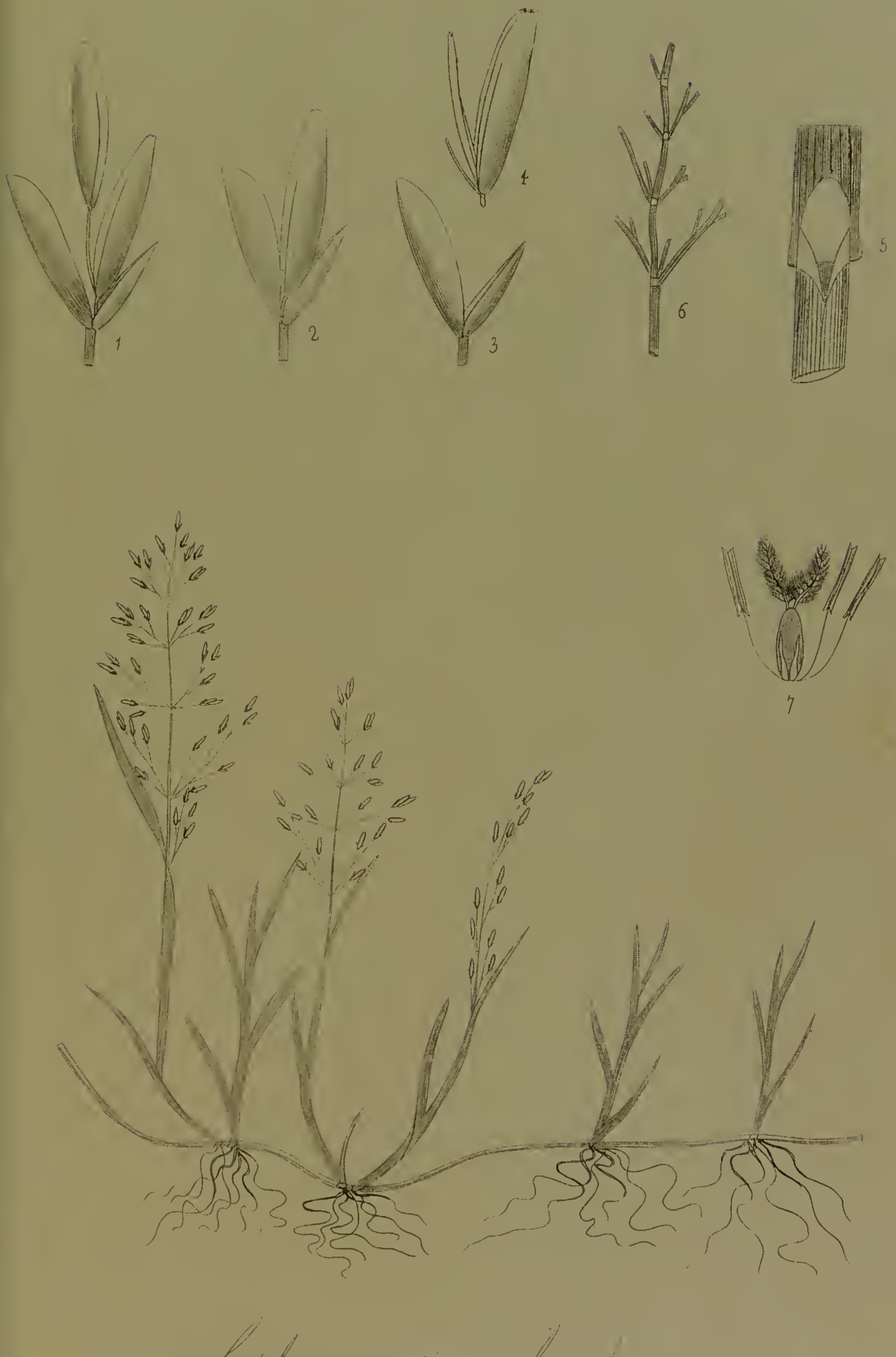
Small Water Hair-Grass.

Plate CII.

This variety appears to be the same as that mentioned by Sir William Hooker in his British Flora, gathered by Mr Wilson on the north shore of Liverpool. I find it common in many places on the west coast of Scotland, growing on the sandy shore within the influence of the tide, forming large patches of nearly half an acre in extent, and sending out shoots in all directions, often to the extent of several feet. The pasture formed of this grass is extremely palatable to cattle, as containing a large portion of saccharine matter, but, as it grows only in wet places, becomes of little agricultural importance. It possesses the same properties as *Catabrosa aquatica*, described in page 47, and differs from it only in being of smaller growth, with the glumes containing mostly but one floret. The root is perennial, fibrous, throwing out several prostrate stems, which take root at their joints. *Stem* hollow, smooth. *Leaves* and sheaths smooth. *Ligule* prominent, about as long as broad, very thin. *Rachis* and branches (when magnified) minutely granulated. *Spikelets* composed of two glumes, and one or two florets; the glumes very unequal, without lateral ribs, the lower one much the smaller. *Florets* obtuse at their summits, three-ribbed; lowermost floret longer than the glumes; second floret elevated on a footstalk, about half the length of the floret; frequently the second floret is altogether wanting. Inner palea rather shorter than the outer palea, obtuse, furnished with a green marginal rib on each side, not fringed. *Styles* short, distinct, terminal. *Stigmas* feathery. *Filaments* slender. *Anthers* notched at each end. *Scales* pointed.

This grass might possibly be mistaken for a *Poa*, an *Aira*, or an *Agrostis*. It is distinguished from a *Poa* in the *glumes* containing not more than two florets, and frequently only one floret; from an *Aira* in the *outer* palea not being awned; and from an *Agrostis* in the

PLATE CII.



Catabrosa aquatica (var.) littoralis

R. Parnell, M.D. del.t et sculp.t

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florets being longer than the glumes. There are many other characters which could be enumerated, but these will be found sufficient. The seeds and young shoots have the taste of liquorice, which is peculiar to this species.

The accompanying figure was taken from a specimen gathered on the west coast of Cantire, near Killean.

Explanation of Plate CII. *Catabrosa aquatica* (var.) *littoralis*, natural size.

Fig. 1. Spikelet of two florets.
2. Spikelet of one floret.
3. Glumes.
4. Lowermost floret, showing the outer and inner paleæ.
5. Ligule of upper leaf.
6. Portion of the rachis and branches, showing the granular appearance.
7. Pistils, stamens, and scales.

Magnified.

MOLINIA CŒRULEA (variety) BREVIRAMOSA.

Small Purple Melic-Grass.

Plate CIII.

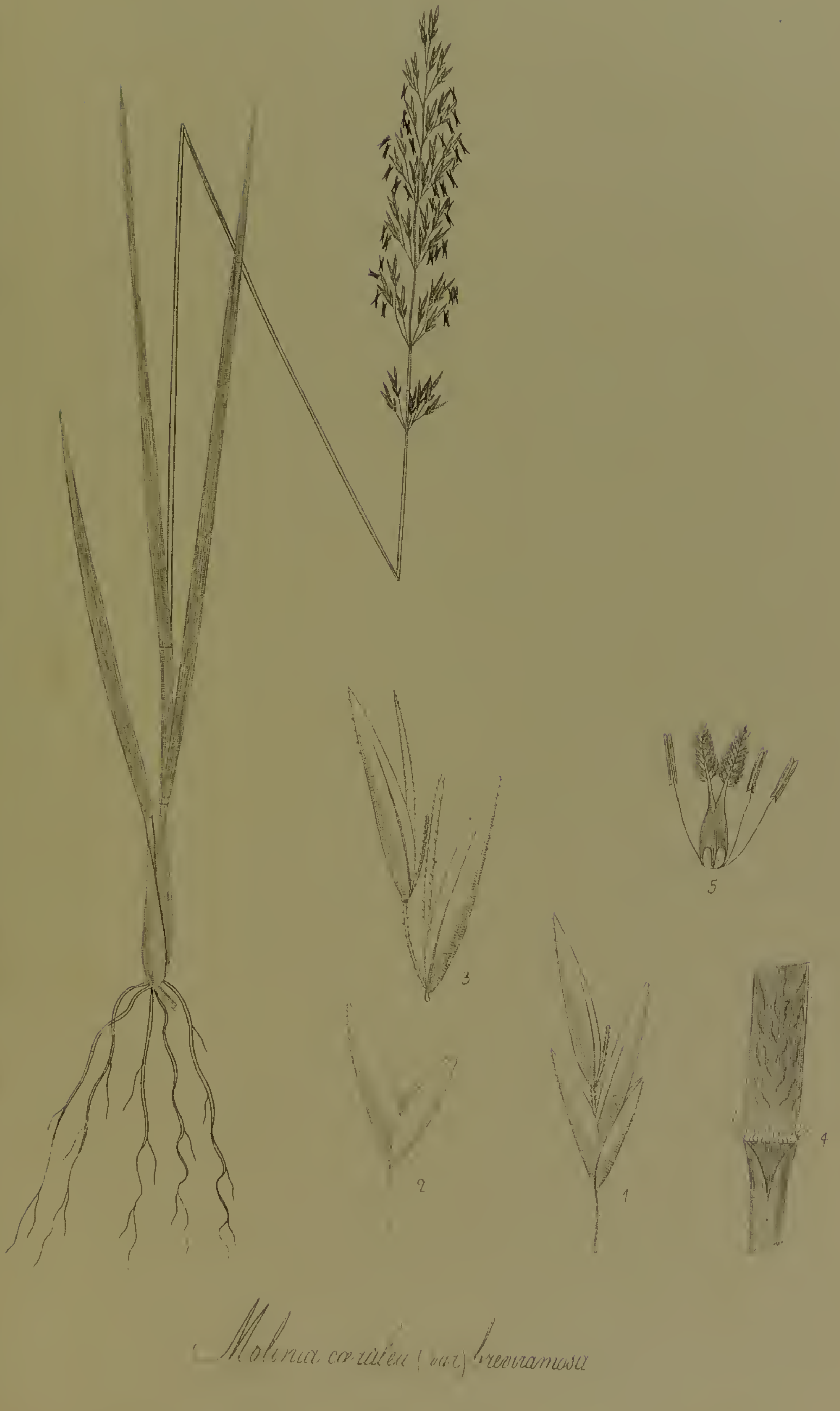
This variety is the same as *Molinia cœrulea*, described in page 46, differing only in being smaller, and the branches of the panicle much shorter, presenting a more compact appearance. It is a very frequent grass on moors, growing on peaty soil, in which the strong fibrous roots penetrate to a considerable depth, taking a strong hold. It is readily distinguished by its dark purple inflorescence, especially in the month of August, at which time it is in full flower. Sheep eat the leaves when young; the stems they leave untouched, as being hard and nearly solid.

The accompanying figure was taken from a specimen gathered in Cantire.

Explanation of Plate CIII. *Molinia cœrulea* (variety) *breviramosa*, natural size.

Fig. 1. Spikelet, showing the two glumes and two florets, and a rudiment of a third floret.
2. Glumes.
3. Two florets, showing the paleæ.
4. Ligule a tuft of hairs.
5. Ovarium, pistils, stamens, and scales.

Magnified.



Molinia cærulea (var.) breviramosa

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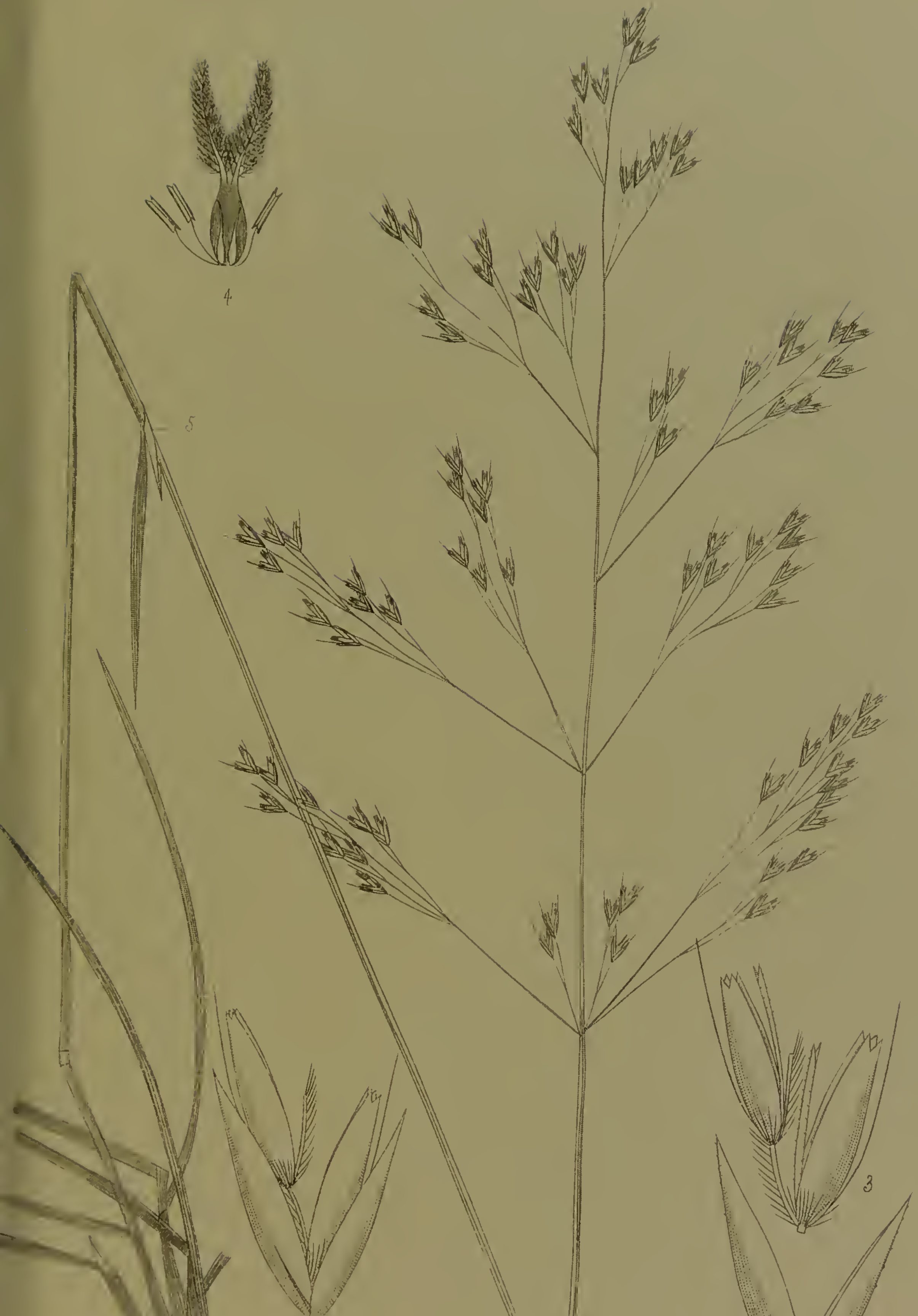
AIRA CÆSPITOSA (variety) LONGIARISTATA.

Long-awned Tufted Hair-Grass.

Plate CV.

This variety is principally distinguished in the awn of the outer palea extending one-fourth of its length beyond the summit of the palea, and the spikelets of a dark chocolate colour, with a shade of purple tipped with white; the sheaths and back of the leaves smooth; in most other respects it is similar to the preceding. It is found occasionally on some of the mountains in Perthshire between three and four thousand feet above the level of the sea. The root is perennial, tufted, throwing out two or three stems from a foot to eighteen inches in length. *Stems* and sheaths perfectly smooth. *Ligules* prominent, acute. *Leaves* of the stem smooth behind, rough on the inner surface. *Rachis* and branches roughish, spreading while in flower. *Spikelets* of two, rarely three, florets. *Glumes* rather unequal, acute, roughish on their keels; lower glume the shorter; upper glume three-ribbed. *Lower* floret equal in length to the small glume, jagged on the summit, hairy at the base, without lateral ribs. *Second* floret on a long hairy footstalk, about half the length of the floret. Both florets awned. *Awn* arising from a little above the base of the outer palea, and extending about one-fourth of its length beyond the summit of the floret, (Fig. 3.) *Styles* short. *Stigmas* prominent and feathery. *Filament* slender. *Anthers* notched at each extremity.

This grass is distinguished from *Aira flexuosa*, the only grass it is likely to be confounded with, in the *leaves* being flat; *sheaths* smooth; *second* floret extending beyond the summit of the large glume; *footstalk* of the second floret about half the length of the floret;—whereas in *Aira flexuosa* the *leaves* are round; the *sheaths* roughish from above downwards; *second* floret not extending beyond the large glume; *footstalk* of the second floret not more than one-fifth the length of the floret.



Aira cæspitosa (var) longiaristata

R. Parnell. M.D del.t et sculp.t

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The accompanying figure was taken from a specimen gathered on Ben Lawers in the month of July.

Explanation of Plate CV. *Aira cæspitosa* (variety) *longiaristata*, natural size.

Fig. 1. Spikelet, showing the glumes and two florets.
2. Glumes.
3. Two florets removed from the glumes, showing the inner paleæ and footstalk of a third floret.
4. Pistils, stamens, and scales.
} Magnified.
5. Ligule long and acute, natural size.

AIRA CÆSPITOSA (variety) BREVIFOLIA.

Short-leaved Tufted Hair-Grass.

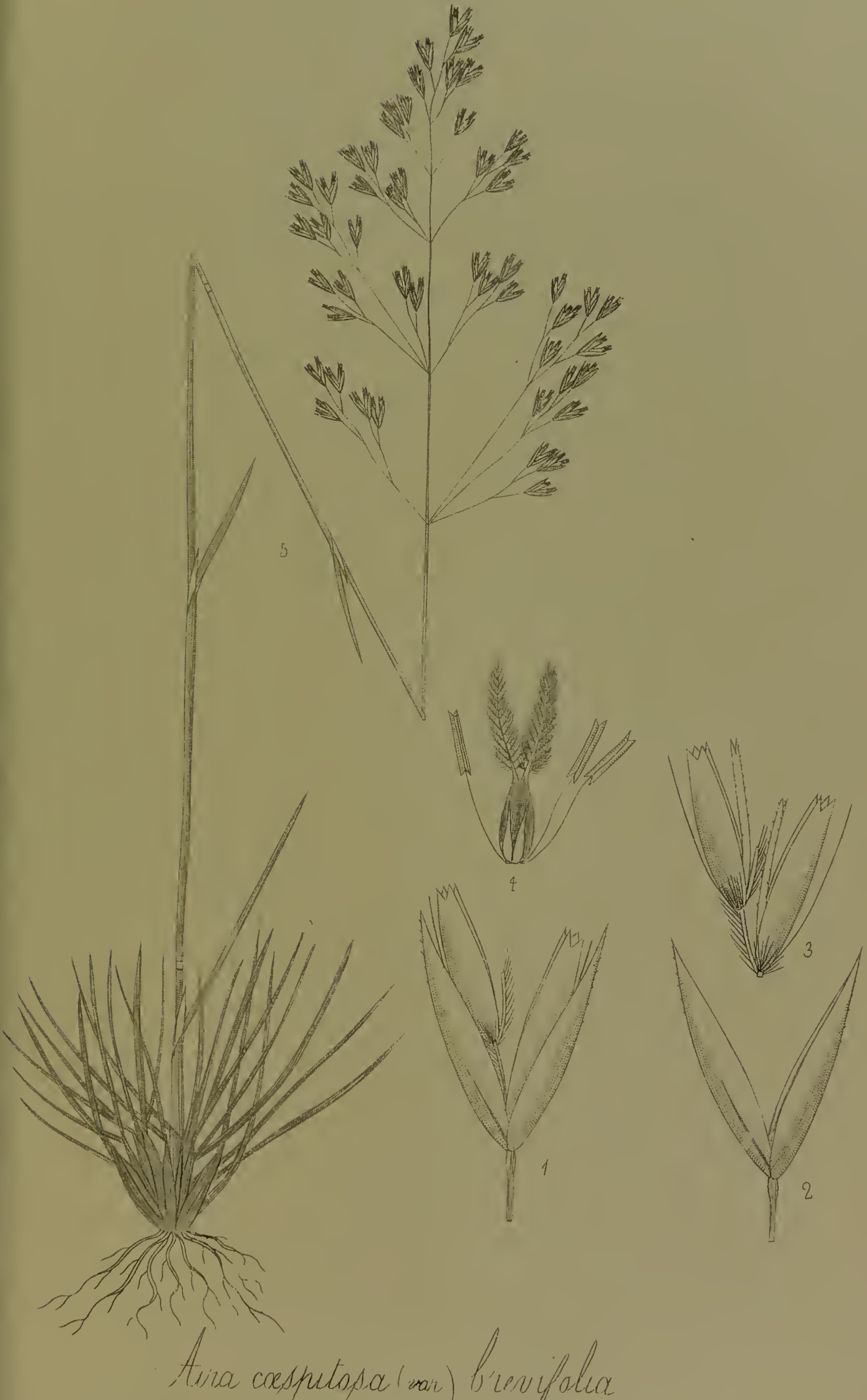
Plate CVI.

This variety of *Aira cæspitosa* is found growing near the summit of some of the highest mountains in Scotland, between 3000 and 4000 feet above the level of the sea. It is principally distinguished by its short radical leaves, smooth sheaths and stem, small panicle, and dark chocolate colour spikelets tipped with white. The *root* is perennial, fibrous, tufted, producing seldom more than one *stem,* which is usually about a foot in length, perfectly smooth. The *sheaths* long and smooth. *Leaves* short, flat, (usually folded, especially those of the root,) acute, rough, harsh, and strongly ribbed on the inner surface, nearly smooth behind. *Ligules* prominent, acute. *Rachis* and branches rough. *Spikelets* rather large, composed of two glumes and two awned florets, with the footstalk of a third floret. *Glumes* nearly of equal lengths, acute; the upper glume three-ribbed, the lower without lateral ribs. Lowermost *floret* rather shorter than the lower glume, jagged or toothed at the summit, hairy at the base, bearing a rough slender awn arising from a little above the base and not extending beyond the summit of the palea, (Fig. 3.) Second floret the same as the first, except being raised on a long hairy footstalk about one-third the length of the floret. *Styles* short, distinct. *Stigmas* prominent, feathery. *Filaments* slender. *Anthers* notched at each end.

It is distinguished from the preceding variety in the whole plant being smaller; the leaves shorter; *awns* of the florets not extending beyond their summits; and the second *floret* but slightly projecting beyond the glumes.

It is likewise distinguished from *Aira alpina* in the *awn* arising from a little above the base of the floret instead of above the centre.

From *Aira flexuosa* in the *sheaths* being quite smooth to the touch, and the *awns* not projecting beyond the summits of the florets;—whereas in *Aira flexuosa* the *sheaths* are rough (from above downwards,) and the *awns* of the florets extend about one-third their



Aira cæspitosa (var) brevifolia

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length beyond the florets; the *leaves* also are more slender and nearly round.

This grass is of no agricultural use, as sheep seldom or never eat it.

It flowers in the first week of August.

The accompanying figure was taken from a specimen gathered on the mountains near Killin, about 3000 feet above the level of the sea.

Explanation of Plate CVI. *Aira cæspitosa* (variety) *brevifolia*, natural size.

Fig. 1. Spikelet, showing the two glumes and two florets, with the footstalk of a third floret.
2. Glumes.
3. Two florets, showing the inner paleæ.
4. Pistils, stamens, and scales.

} Magnified.

5. Ligule long and pointed, natural size.

AIRA FLEXUOSA.

Wavy Mountain Hair-Grass.

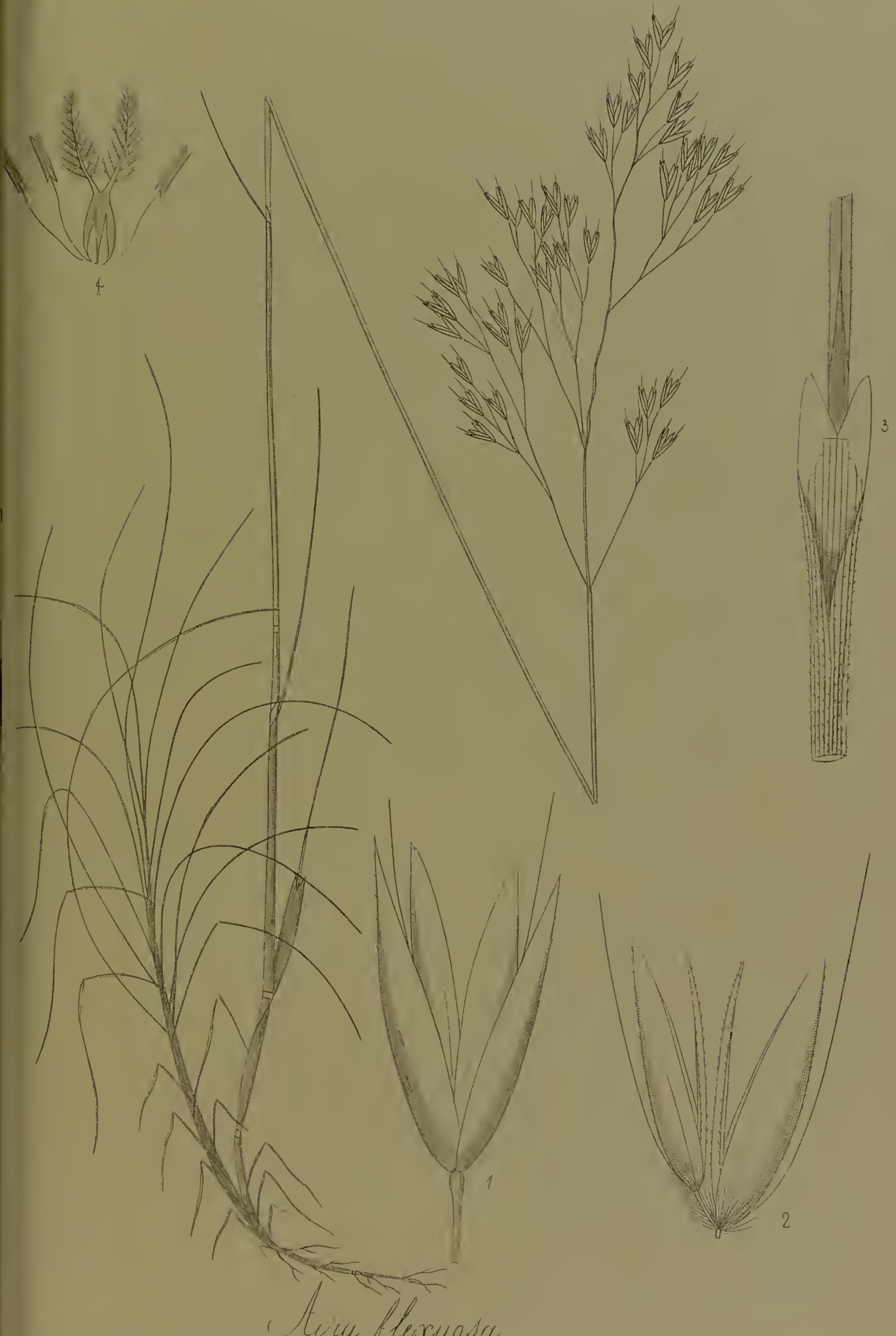
Plate CVII.

Specific Characters.—Awn arising from a little above the base of the outer palea, and extending about one-fourth of its length beyond the summit of the palea.

Description.—Root perennial, fibrous, woolly in sandy ground. *Stem* hollow, erect, flattish, smooth, striated, and frequently of a purple tinge, from twelve to eighteen inches high, bearing three or four leaves with roughish, striated sheaths (the roughness is distinctly felt by passing the finger down the sheath); upper sheath about twice the length of the leaf. *Ligule* of upper sheath prominent, about as long as broad, almost always cloven and rounded at the summit. *Joints* three, smooth. *Leaves* very narrow, fleshy, subterete, the upper leaf rough the whole length, those from the root smooth, except towards their points; in dry exposed situations the radical leaves are short and curved; while in woods or shady places they are long and of a dark green, the base surrounded with brown, thin, withered sheaths of former years. *Panicle* erect, spreading, the branches slender, rough, slightly wavy, mostly triple-forked; *rachis* wavy, smooth below, rough above. *Spikelets* of a brownish glossy copper colour, composed of two glumes and two awned florets with the rudiment of a third. *Glumes* rather unequal, membranous, without lateral ribs, slightly roughish on their keels. *Florets* concealed within the glumes; outer palea of lowermost floret notched or jagged at the summit, hairy at the base, very faintly five-ribbed, furnished with a slender rough awn arising from a little above the base and extending about one-fourth of its length beyond the summit. Inner palea about the length of the outer, very thin, acute, often bifid, minutely fringed at the margins. Second floret rather the smaller, on a short hairy footstalk about one-fifth the length of the floret; in other respects the two florets are similar. *Styles* short. *Stigmas* prominent and feathery. *Filaments* slender. *Anthers* notched at each end. *Scales* pointed.

Obs.—*Aira flexuosa* is distinguished from *Aira cæspitosa* in the *ligule* being obtuse, and about as long as broad; *awn* extending about

PLATE CVII.



Aira flexuosa

R. Parnell, M.D. delt et sculpt

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one-fourth of its length beyond the summit of the outer palea; *footstalk* of the second floret less than one-fourth the length of the floret;—whereas in *Aira cæspitosa* the *ligule* of upper sheath is long and acute, twice as long as broad; *awn* not extending more than one-eighth its length beyond the summit of the outer palea, very often much less; *footstalk* of the second floret about half the length of the floret.

Aira flexuosa is distinguished from *Aira caryophyllea* in the *ligule* of upper sheath being obtuse, and about as long as broad; *outer palea* jagged at the summit, not beaked; *sheaths* of leaves rough only when felt from above downwards;—whereas in *Aira caryophyllea* the *ligule* of upper sheath is acute, and long, nearly twice as long as broad; *outer* palea somewhat beaked at the summit; *sheaths* of leaves rough only when felt from below upwards; the *spikelets* not half the size.

Aira flexuosa is distinguished from *Aira præcox* in being a much larger plant with a spreading panicle; *ligule* obtuse, and about as long as broad; *sheath* of leaves rough only when felt from above downwards; *awn* extending about one-fourth of its length beyond the summit of the outer palea;—whereas in *Aira præcox* the *panicle* is contracted, close; *ligule* long and acute, about twice as long as broad; *sheaths* of leaves rough only when felt from below upwards; *awn* extending half its length beyond the summit of the palea.

The accompanying figure was taken from a specimen gathered in the neighbourhood of Edinburgh.

Explanation of Plate CVII. *Aira flexuosa,* natural size.

Fig. 1. Spikelet, showing the glumes and two florets.
2. The two florets removed from the glumes, showing the awns and inner palea.
3. Ligule almost always cloven.
4. Pistils, stamens, and scales.

Magnified.

I previously noticed this plant among the grasses of Scotland, but the figure and description there given were not sufficiently minute to distinguish it from some of the more closely allied species. I scarcely think this plant to be the *Aira flexuosa* of Smith, since in the English Flora it is stated that the awn arises from the *middle* of the outer valve, and is *twice* as long as the glumes. For further description see pages 55 and 56.

AIRA FLEXUOSA (variety) MONTANA.

Slender Mountain Hair-Grass.

Plate CVIII.

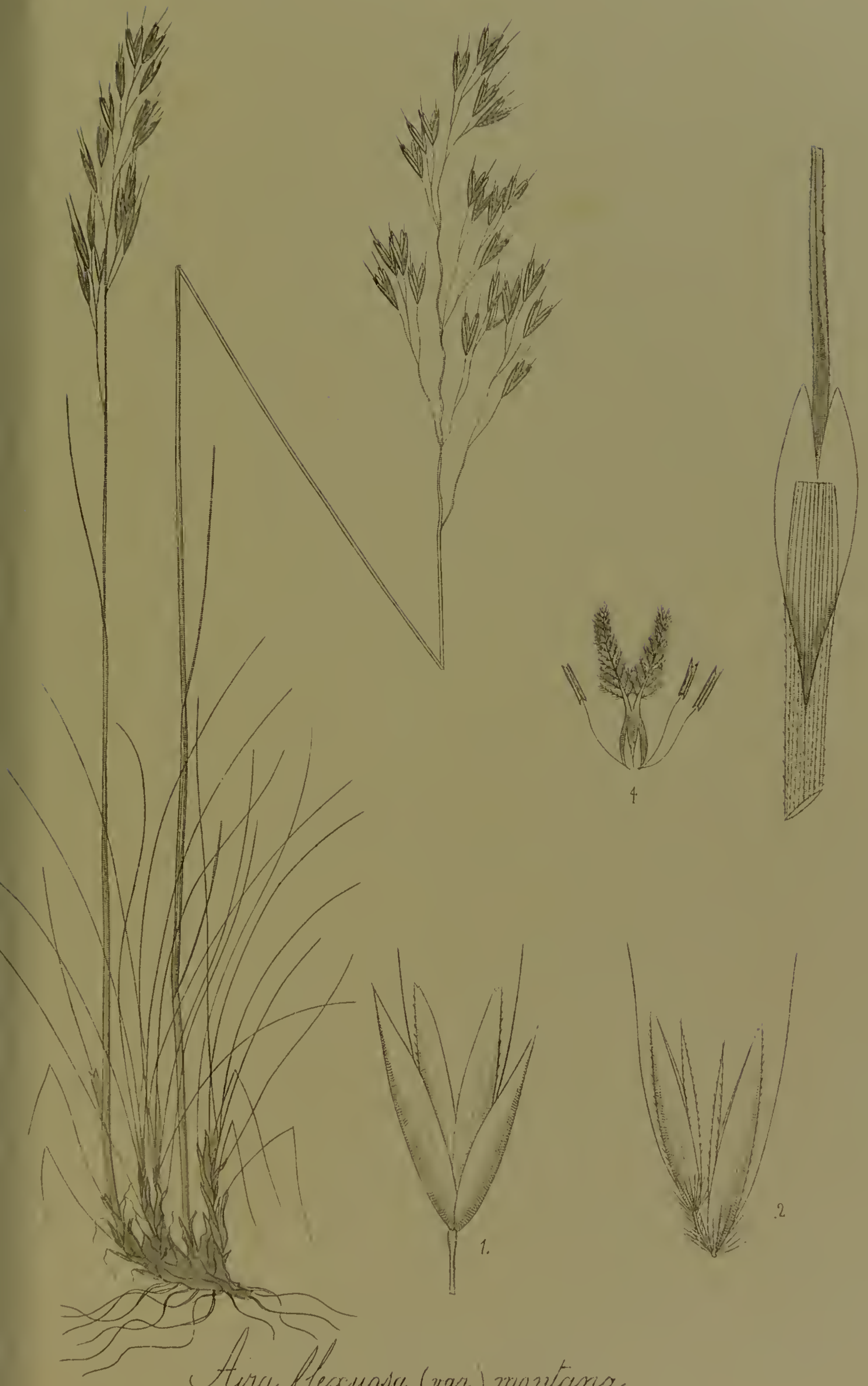
This variety is frequent on the Highland moors, growing on peaty soil among heather; flowering in the first week of August. It is principally distinguished from the preceding in being of a more slender habit; *ligules* more acute, and the lowermost floret projecting conspicuously beyond the small glume. In other respects the two plants are similar.

The accompanying figure was drawn from a specimen gathered on Ben Lawers.

Explanation of Plate CVIII. *Aira flexuosa* (variety) *montana*, natural size.

Fig. 1. Spikelet, showing the glumes and floret.
2. Florets removed from the glumes, showing the inner paleæ and awns.
3. Ligule cloven.
4. Pistils, stamens, and scales.
} Magnified.

PLATE CVIII



Aira flexuosa (var) montana

R. Parnell. M.D. delt. et sculpt.

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AIRA ALPINA (variety) VIVIPARA.

Viviparous Alpine Hair-Grass.

Plate CIX.

This grass seems to be the *Aira lævigata* figured in the English Botany, t. 2102, which, according to Sir William Hooker and other botanists, is the *Aira alpina* in a viviparous state. It is frequently met with on several of the Scottish mountains, growing among moist or wet rocks, usually at an altitude of between three and four thousand feet above the level of the sea. It is said also to grow on some of the higher mountains in Wales. The *root* is perennial, fibrous, tufted, bearing a short, stout, perfectly-smooth stem. *Sheaths* smooth. *Ligule* prominent and acute. *Leaves* acute, harsh, flat, (those of the root mostly folded), rough and strongly ribbed on the inner surface, smooth behind. *Rachis* and branches perfectly smooth. *Spikelet* composed of two glumes and two florets, the florets being transformed into small linear leaves curved at the summit, or frequently terminating in a small rough point or awn. *Glumes* nearly equal, membranous, tinged with purple, while the leafy florets are of a light green. None of the viviparous grasses produce seed; they propagate their species through the medium of their florets, which fall and take root.

The most prominent marks of distinction in this grass, independent of its viviparous form, rest in the stem, sheaths, back of the leaves, rachis, and branches being perfectly smooth.

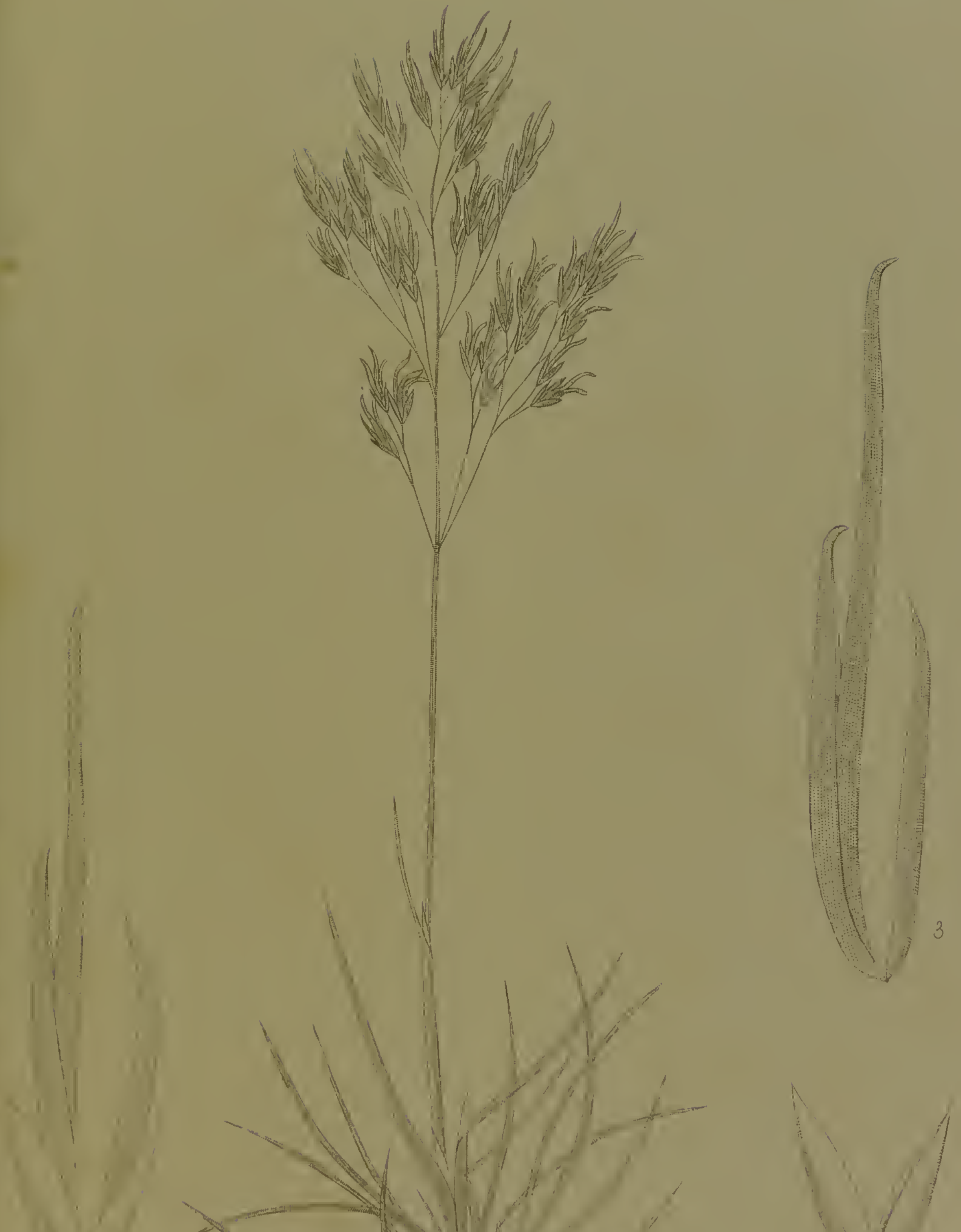
The accompanying figure was drawn from a specimen gathered on Ben Lawers.

Explanation of Plate CIX. *Aira alpina* (variety) *vivipara,* natural size.

Fig. 1. Spikelet, showing the glumes and florets.
2. Glumes.
3. Florets transformed into small leaves.
} Magnified.

4

PLATE CIX.



Aira alpina (var.) vivipara

Parnell M.D. del. et sculp.

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AIRA CANESCENS.

Clubbed Hair-Grass.

Plate CX.

Specific Characters.—Awns clavate, fringed in the centre.

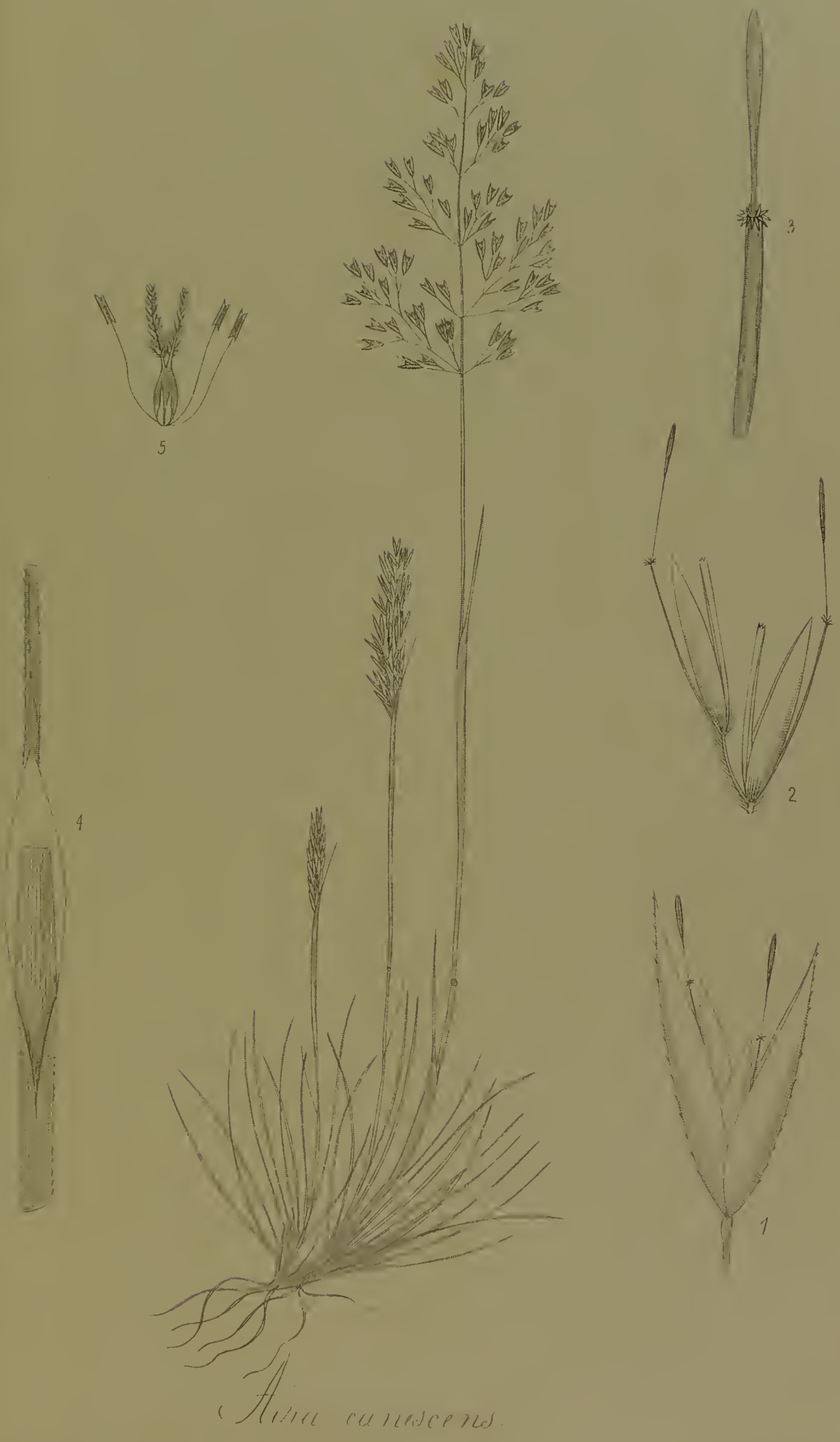
Description.—Root annual or biennial, fibrous, producing stems from six to fourteen inches in length. *Stems* erect, round, smooth, hollow, bearing four or five leaves with rough, striated sheaths; the upper leaf shorter than its sheath. *Ligule* of upper sheath prominent, acute, about twice as long as broad. *Joints* about three, the upper usually naked. *Leaves* setaceous, short, rough, and glaucous. *Inflorescence* compound panicled, spreading while in flower, otherwise close, frequently tinged with purple; the branches rough; the rachis mostly smooth. *Spikelets* composed of two glumes and two florets. *Glumes* of about equal lengths, membranous, acute, without lateral ribs, minutely toothed on their keels. *Florets* shorter than the glumes, of two paleæ; the outer palea acute, not beaked or bifid at the summit, without lateral ribs, hairy at the base, furnished with a long dorsal awn; the inner palea membranous, narrow, notched at the summit, smooth on the lateral folds, and about the length of the outer palea. *Awn* arising from a little above the base of the outer palea, and extending half its length beyond the palea, club-shaped above, and furnished in the centre with a circular fringe. *Styles* two, short. *Stigmas* long and feathery. *Filaments* three, slender. *Anthers* short, dark purple.

Obs.—Aira canescens is readily distinguished from all the other British grasses in the form of the *awns* of the florets, which are clubshaped and fringed in the centre, (see Fig. 3, magnified.)

This is one of our rarest British grasses, found only on the sandy coasts of Dorset, Norfolk, and Suffolk. It is of more frequent oc-

Aira canescens, Linn., Eng. Bot., Knapp, Schrad., Smith, Hooker. *Corynephorus canescens*, Beauv., Koch, Kunth, Bab.

PLATE CX



Aira canescens.

R. Parnell M.D. delᵗ et sculpᵗ

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currence in Norway, Sweden, France, Germany, Holland, Belgium, Switzerland, Italy, Spain, Portugal, Turkey, Greece, and the Islands of the Mediterranean. It is comparatively of little value for agricultural purposes.

Flowers in July, and ripens its seed in August.

The accompanying figure was taken from specimens gathered in Suffolk.

Explanation of Plate CX. *Aira canescens*, natural size.

Fig. 1. Spikelet, showing the two glumes and two florets.
2. Florets removed from the glumes, showing the paleæ and awns.
3. Awn showing the fringe in the centre.
4. Ligule of upper sheath.
5. Ovarium, pistils, stamens, and scales.

Magnified.

Festuca bromoides (variety) Pseudo-Myurus.

Sheathed Barren Fescue-Grass.

Plate CXI.

Although this grass is considered by most authors as a distinct species, I cannot myself find any specific mark of distinction between it and *Festuca bromoides*, described in p. 127, excepting in the panicle being larger and the stem sheathed further up, characters which can scarcely be considered of sufficient importance to constitute a species. It is a frequent grass in England, Ireland, and Scotland, growing in corn-fields and other cultivated places.

Flowers in the middle of June, and ripens its seed early in July.

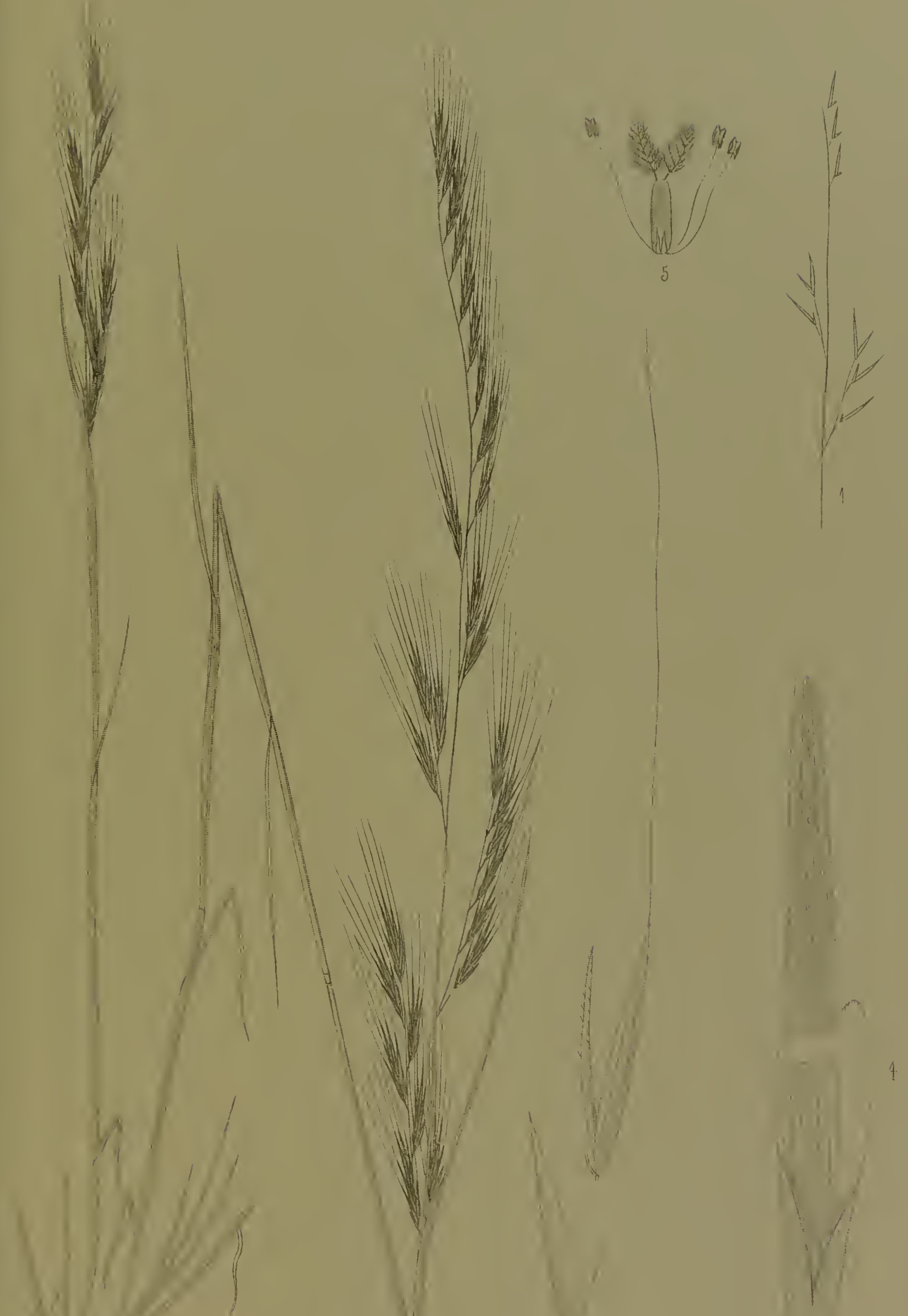
It possesses no agricultural merits worthy of notice. I have found it a very common grass throughout France and Germany.

Explanation of Plate CXI. *Festuca bromoides* (variety) *Pseudo-Myurus*, natural size.

Fig. 1. Showing the glumes how they differ in length in different spikelets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Ligule lobed on one side.
5. Ovarium, pistils, stamens, and scales.

Magnified.

Festuca bromoides, Bab. *Festuca Myurus*, Hooker, Smith. *Festuca Pseudo-Myurus*, Koch.



Festuca bromoides (Barren Brome-Fescue)

W. & A. K. Johnston sculp.

[illegible]

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FESTUCA UNIGLUMIS.

Small-glumed Fescue-Grass.

Plate CXII.

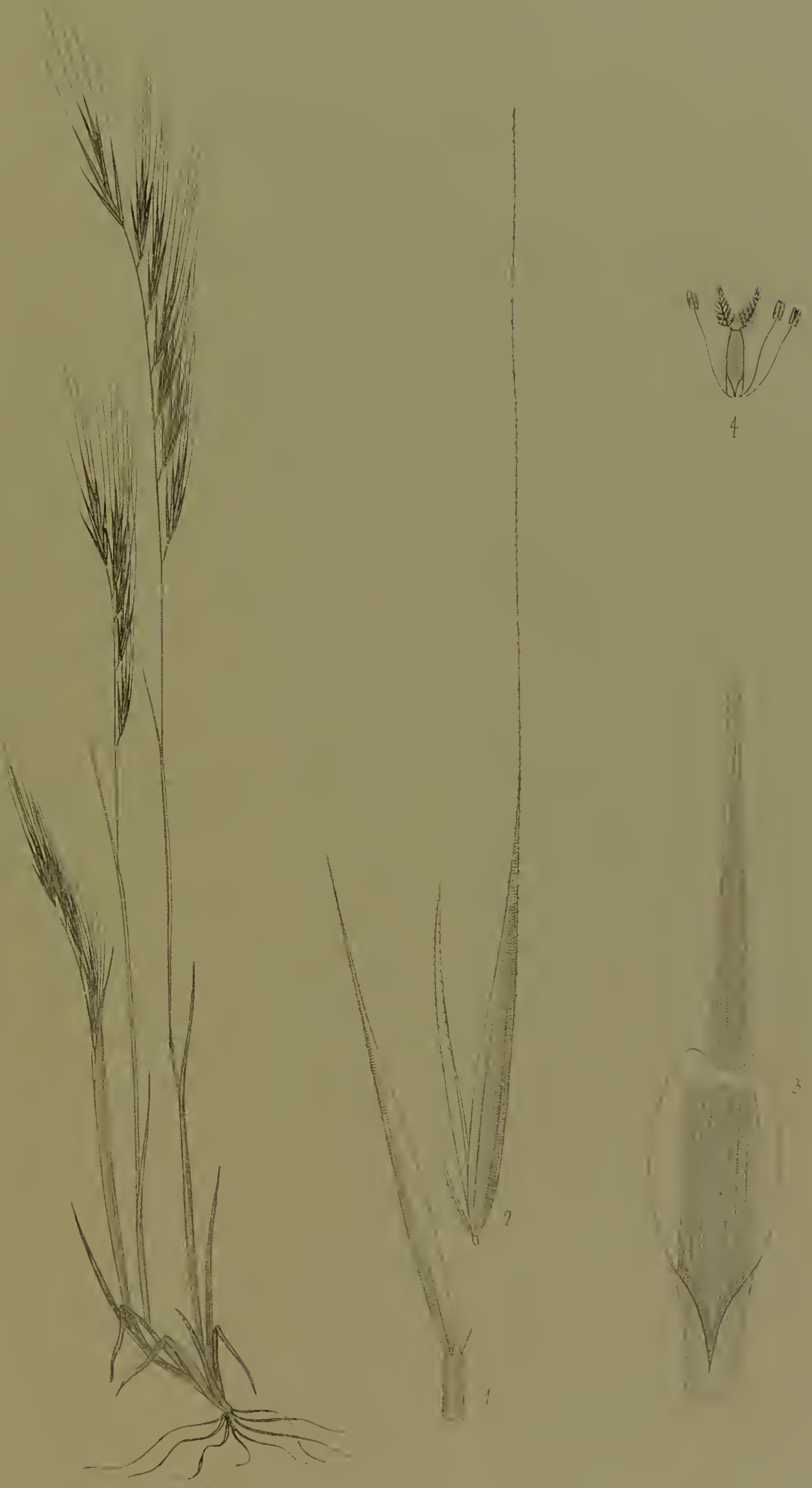
Specific Character.—Lower glume extremely small.

Description.—Root annual, fibrous, producing stems from four to fifteen inches in length. *Stems* erect, hollow, smooth, slender, angular especially on the upper part, bearing three or four leaves with smooth, striated sheaths, the upper sheath much longer than its leaf. *Ligule* of upper sheath very short, lobed on both sides. *Joints* usually three, the upper one generally naked. *Leaves* small, narrow, mostly involute, smooth behind, hairy on the inner surface. *Inflorescence* racemed, subsecund. *Spikelets* composed of two glumes and five or six florets. *Glumes* very unequal; the outer one nearly obsolete, scarcely perceptible without the aid of a lens; the inner glume long and narrow, three-ribbed, terminating in a rough, slender point. *Florets* of two paleæ; the outer palea of lowermost floret about equal in length to the large glume, five-ribbed, rough on the upper part, terminating in a long, rough awn, about twice the length of the palea; inner palea thin, narrow, mostly cloven at the summit, furnished with two green ribs minutely fringed on the upper half. *Styles* two. *Stigmas* feathery. *Filaments* three, capillary. *Anthers* notched at each end. *Scales* small.

Obs.—The best distinguishing character between this grass and *Festuca bromoides* is the almost total suppression of the lower glume. It is likewise distinguished from the other species of *Festuca* in the great length of the awns of the florets, which more than exceeds the length of the palea.

This grass grows in dry sandy situations, principally near the sea coasts. It has been found in Devonshire, Dorset, Sussex, Essex, Suffolk, Anglesea, and Ireland, but not in Scotland. It is also a

Festuca uniglumis, Soland., Koch, Kunth, Smith, Hooker, With., Bab., Knapp.



Festuca uniglumis

R. Parnell, M.D. del. et sculp.

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native of France, Germany, Switzerland, and Italy. Of no agricultural importance.

Flowers in June, and ripens its seed in the middle of July.

The accompanying figure was taken from specimens gathered in Devonshire.

Explanation of Plate CXII. *Festuca uniglumis*, natural size.

Fig. 1. Glumes, the lowermost very small.
2. Floret, showing the two paleæ.
3. Ligule of upper sheath.
4. Ovarium, pistils, stamens, and scales.

Magnified.

BUCETUM LOLIACEUM (variety) LONGIGLUME.

Long-glumed Bucetum-Grass.

Plate CXIII.

There is no grass at first sight more likely to be mistaken for the common *rye-grass* (Lolium perenne) than the present one, but if we examine the two plants closely they will be found to differ widely. In the plant under consideration the spikelets have two glumes on a short though distinct footstalk, (see Fig. 1);—while in the *rye-grass* the spikelets have but one glume, (the terminal one excepted,) and that perfectly sessile on the rachis.

That this grass is the true *Festuca loliacea* of Hudson there seems but little doubt, and that it has frequently been confounded with the following variety, as well as with *Bucetum loliaceum* described in page 104. Independent of the length of the upper glume, it is distinguished by the glumes being flat, the upper one with seven or eight ribs, and the foliage of a dark green.

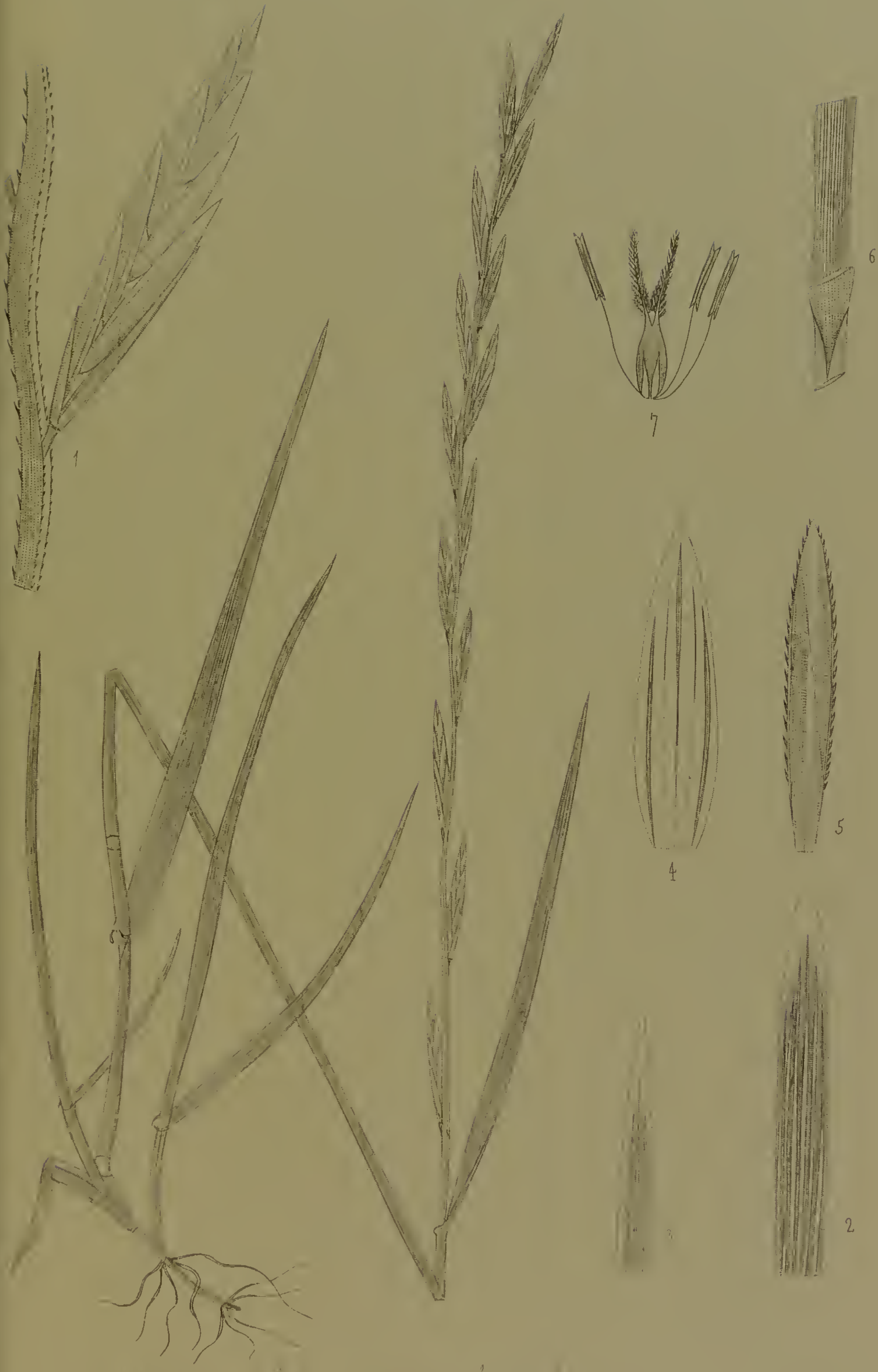
It is a frequent grass in Scotland, England, and Ireland, growing in meadows, and is one of our most valuable permanent pasture grasses, producing a large quantity of herbage, which is much relished by cattle.

It flowers late in July, and the seeds are seldom found in a state of maturity.

It is very justly remarked by Mr Murphy, in his treatise on the grasses of Ireland, that "if this grass be not a good species it is certainly a very marked variety, which some botanists have confounded with *Bucetum pratense.*"

Description.—Root perennial, creeping, producing stems which are either erect or nearly prostrate. *Stems* smooth, hollow, round, striated, bearing three or four leaves with smooth, striated sheaths; upper sheath longer than its leaf. *Ligules* short, obtuse, clasping the stem with a small auricle on each side. *Joints* two or three, situated on the lower part of the stem. *Leaves* of a dark green, flat, lanceolate, acute, smooth behind, rough in front, frequently with a

Festuca loliacea, Hud., Smith, Hooker, With., Knapp, Koch, Kunth. *Lolium festucaceum*, Link., Leighton.



Triticum loliaceum (var) longiglume

Parnell M.D. del^t et sculp^t

Printed by [illegible] Gellatly.

Published by W^m Blackwood & Sons. Edinburgh & London

few rather long scattered hairs. *Inflorescence* racemed, never spiked or panicled. *Spikelets* with very short footstalks arranged alternately on each side of the rachis. *Rachis* wavy, grooved, toothed. *Glumes* two, very unequal, containing usually seven awnless florets; large glume about half the length of the spikelet, flat, obtuse, with seven or eight prominent ribs; small glume not half the size, lanceolate, acute, flat, with three prominent, smooth ribs. *Lowermost* floret about as long as the large glume; outer palea five-ribbed, the lateral ribs very distinctly marked, of a light green, the middle ribs imperfectly seen on the lower half; inner palea equal in length to the outer, and in some instances rather longer, acute, furnished with a green rib on each side, and distinctly toothed. *Styles* two, short. *Stigmas* long and feathery. *Filaments* slender, three. *Anthers* notched at each end. *Scales* acute.

Explanation of Plate CXIII. *Bucetum loliaceum* (variety) *longiglume*, natural size.

Fig. 1. Spikelet on the rachis, showing the short footstalk, and the long glume which is about half the length of the spikelet.
2. Large glume, showing the ribs.
3. Small glume.
4. Outer palea opened, showing the five ribs.
5. Inner palea, showing the toothed margins.
6. Ligule very short, auricled.
7. Ovarium, pistils, stamens, and scales.

Magnified.

BUCETUM LOLIACEUM (variety) ELONGATUM.

Elongated Bucetum-Grass.

Plate CXIV.

This grass is distinguished from the preceding in the large glume being shorter, concave, and five-ribbed; and from *Bucetum loliaceum*, figured in Plate XLV., in the spikelets being longer, and the whole plant much taller. It is likewise distinguished from *Poa fluitans* (variety) *subspicata*, in the ligules being very short, and the outer palea only five-ribbed; instead of the ligules being long, and the outer palea seven-ribbed. (See Plate XCV.)

It bears some resemblance to *Triticum pinnatum* (variety) *gracile*, figured in Plate CXXXIII., from which it differs in the sheaths of leaves not being hairy; *ligules* very short and auricled; *large glume* five-ribbed; *outer palea* five-ribbed and not awned;—while in *Triticum pinnatum* (variety) *gracile*, the lower sheaths are distinctly hairy; *ligules* prominent, not auricled; *large glume* seven-ribbed; *outer palea* seven-ribbed and awned from the summit.

We find this grass equally common with the preceding, and growing in the same situations. It is a valuable grass for irrigated land, especially where the soil is rich and deep, and generally forms a part of our best meadow-pastures in England, Ireland, and Scotland.

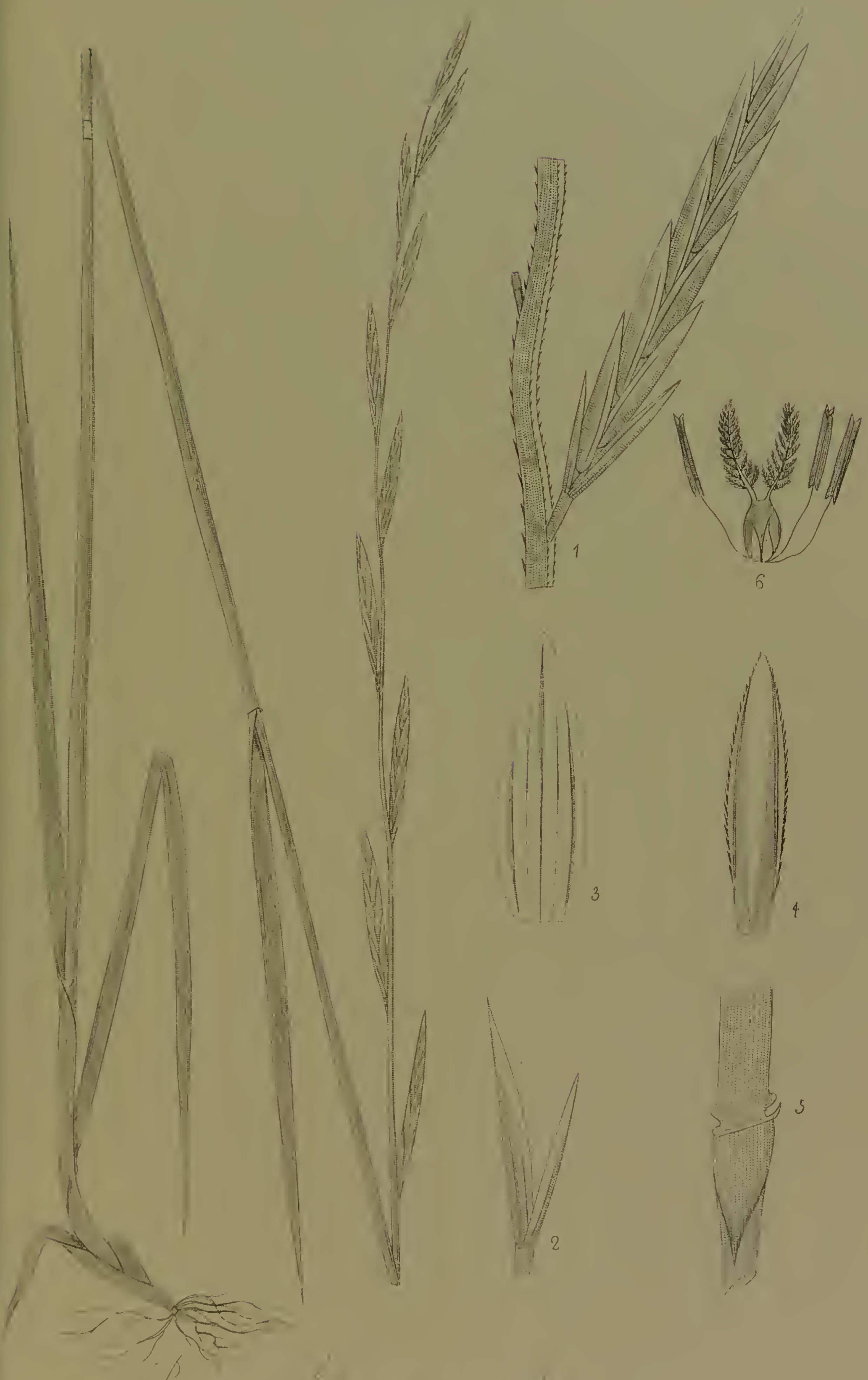
I have occasionally met with it in Germany, and have found it not uncommon in Belgium, growing most luxuriantly on those lands the most esteemed for grazing.

It flowers towards the end of July and ripens its seed in September.

Explanation of Plate CXIV. *Bucetum loliaceum* (variety) *elongatum*, natural size.

Fig. 1. Spikelet on the rachis, showing the short footstalk, and outer glume, which is about one-third the length of the spikelet.
2. Glumes concave, upper one five-ribbed.
3. Outer palea opened, showing the five ribs.
4. Inner palea, showing the toothed margins.
5. Ligule very short, auricled.
6. Ovarium, pistils, and stamens.

Magnified.



Triticum loliaceum (var.) elongatum

Parnell A.D. del. et sculp.

Printed by J. Gellatly.

Published by Wm Blackwood & Sons Edinburgh & London.

BROMUS MAXIMUS.

Great Brome-Grass.

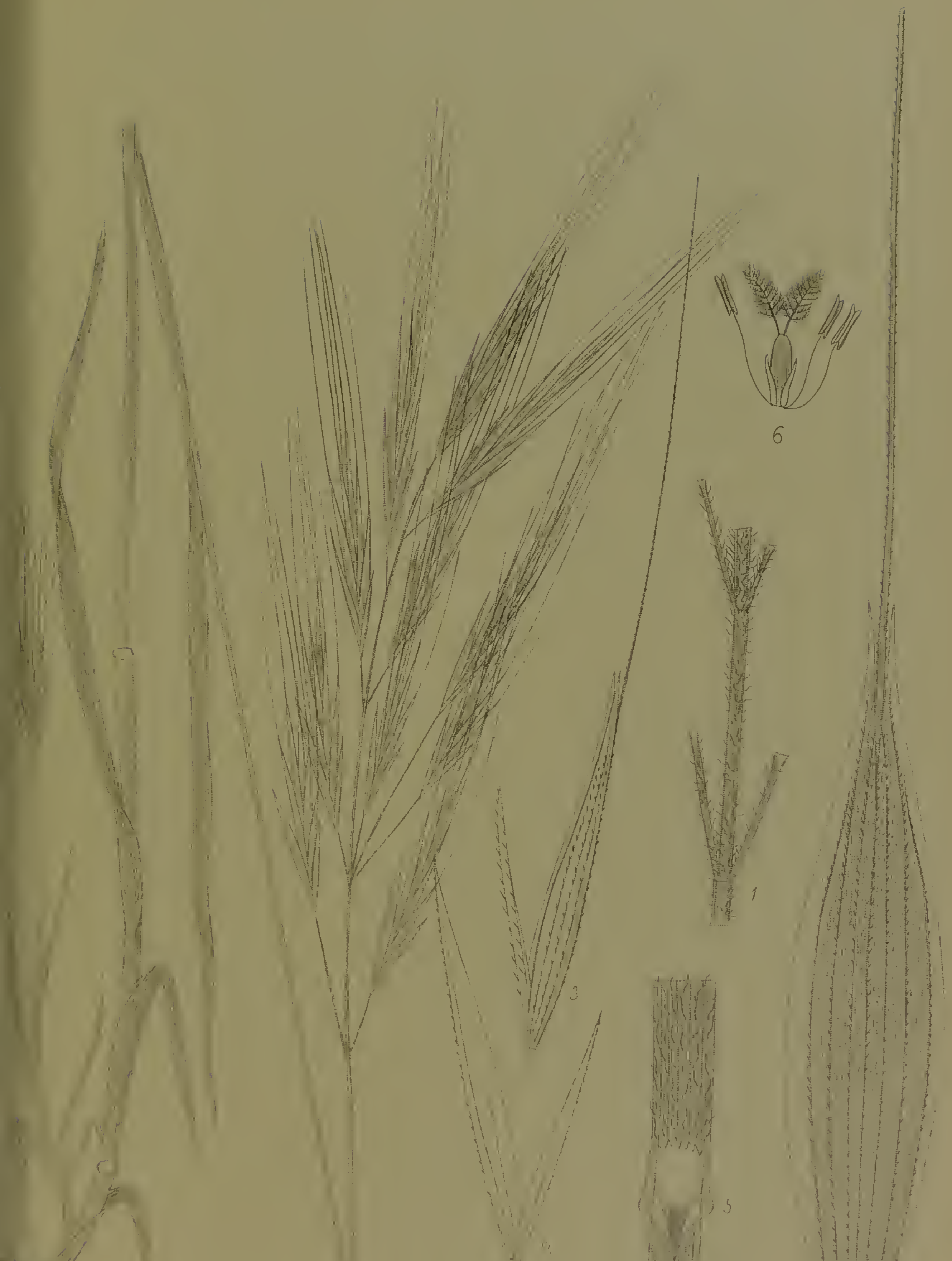
Plate CXV.

Specific Characters.—Rachis pubescent. Awns longer than their florets. Outer palea equal in length to the large glume.

Description.—Root annual, fibrous. *Stem* erect, hollow, round, slightly downy, from one to two feet high, bearing four or five leaves with striated sheaths ; upper sheath rather longer than its leaf, smooth ; the lower sheaths soft and downy. *Ligule* of upper sheath prominent, ragged, about as long as broad. *Joints* usually four, the upper one placed about the centre of the stem, mostly uncovered. *Leaves* flat, acute, downy on both sides, roughish on the margins. *Inflorescence* racemed, erect, the rachis and footstalks downy, (not in the slightest degree scabrous.) *Spikelets* lanceolate, about an inch and a quarter in length, and, including the awns, two inches and a half in length ; composed usually of eight-awned florets and two glumes, with downy footstalks not the length of the spikelets. *Glumes* unequal, not downy, minutely toothed on their keels ; the outer one the smaller, about one-third shorter than the inner, of a lanceolate form, three-ribbed ; the inner much larger, of the same form, five-ribbed. *Florets* of two paleæ ; the outer palea of lowermost floret acutely lanceolate, as long as the large glume, very rough to the touch when felt from above downwards, (not downy), bifid at the summit, membranous and glossy at the margins, sharply pointed at the base, furnished with seven prominent rough ribs, the three central ribs continuous with the awn. *Awns* straight and rough, arising from a little below the bifid membranous summit of the outer palea ; the awn of the lowermost floret the shortest, which more than equals the length of the outer palea by one-half ; *none of the awns ever exceed twice the length of their florets ;* inner palea about one-third shorter than the other, very thin and membranous, linear-lanceolate, fringed at the folds the whole length. *Styles* two, arising from the summit of the ovarium. *Stigmas* feathery. *Filaments* three. *Anthers* notched at each end. *Scales* acute.

Bromus maximus, Desf., Kunth, Hooker, Bab.

PLATE CXV



Bromus maximus

Parnell M.D. del & sc.

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Published by Wm Blackwood & Sons. Edinburgh & London.

Obs.—*Bromus maximus* is distinguished from *Bromus sterilis*, in the *rachis* and footstalks being downy and soft to the touch; *lowermost* floret equal in length to the large glume;—whereas in *Bromus sterilis* the *rachis* and footstalks are hispid and very rough to the touch, and the lowermost floret is about one-fourth longer than the large glume.

Bromus maximus is distinguished from *Bromus diandrus* in the lowermost *floret* being equal in length to the large glume; *awn* of the floret longer than the outer palea by one-half or more; *inner palea* about one-third shorter than the outer palea; the *rib* on each side of the central rib of the outer palea very distinct and prominent;—whereas in *Bromus diandrus* the lowermost *floret* is longer than the large glume by one-fourth; *awn* of the floret equal in length to the outer palea; *inner* palea about equal in length to the outer palea; the *rib* on each side of the central rib of the outer palea very indistinct.

The peculiar, sharp, conical point at the base of the florets will readily distinguish *Bromus maximus* from all the other species of British Bromi.

It is fortunate that this is so rare a British grass, as neither horses, cows, or sheep are fond of it or any other grass having soft downy leaves; besides which, the florets, when ripe, possess the property of insinuating themselves under the wool of sheep and entering the flesh to a considerable depth, thereby proving a great source of annoyance to the animal. It has been found by Mr Babington growing on the sands of St Aubin's Bay, the Grève d'Azette, and the Quinvais, Jersey, but in no other part of Britain is it known to exist. It is also a native of France, Spain, and Africa.

Flowers in June and July.

The accompanying figure was taken from a specimen sent me by Mr Babington.

Explanation of Plate CXV. *Bromus maximus*, natural size.

Fig. 1. Part of the rachis and branches.
2. Glumes.
3. Floret.
4. Outer palea, showing the seven ribs.
5. Ligule.
6. Ovarium, showing the styles arising from the summit.

Magnified.

BROMUS MOLLIS.

Soft Brome-Grass.

Plate CXVI.

As the *Bromi* are so liable to be confounded by young botanists, I have here given extra plates of some of the more closely allied species, pointing out more fully their specific distinctions and varieties.

Bromus mollis is distinguished by the *spikelets* being hairy, with the *apex* of the large glume situated midway between the base of the glume and the summit of the third floret on the same side, as seen in Fig. 1.

It is distinguished from *Bromus racemosus*, in the *spikelets* being hairy, and the middle *rib* of the glumes not toothed;—whereas in *Bromus racemosus* the *spikelets* are not hairy but glossy, and the middle rib or keels of the glumes minutely toothed on the upper half, (see Plate CXIX., Fig. 1.)

Independent of the specific distinctions between these too closely allied species, they seem to differ somewhat in habit, although some authors have placed them as varieties.

Explanation of Plate CXVI. *Bromus mollis*, natural size.

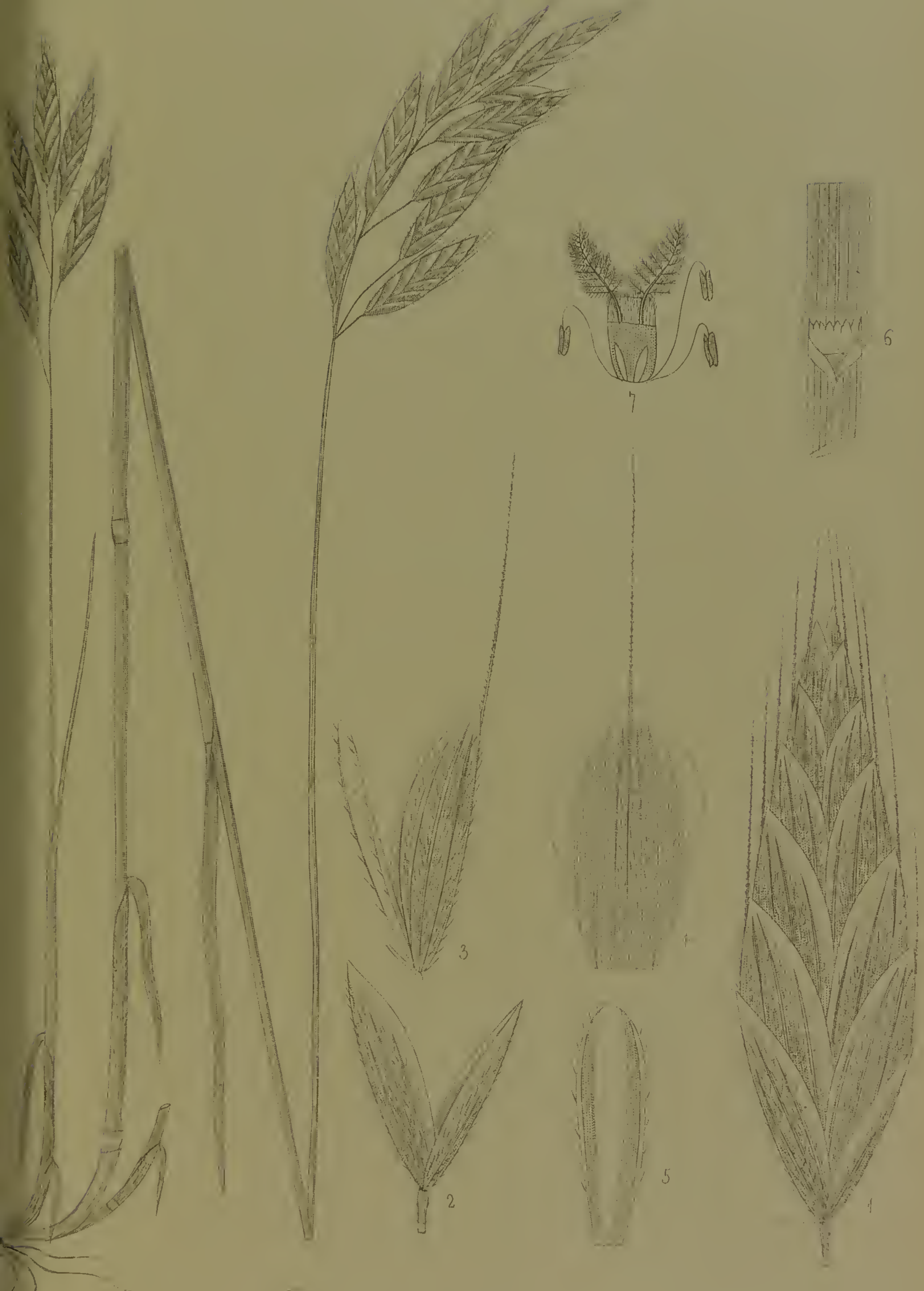
Fig. 1. Spikelet, showing the two glumes and eleven florets.
2. Glumes.
3. Second Floret, showing the outer and inner paleæ, with an awn equal in length to its palea; the awn of the lowermost florets being always shorter than its palea.
4. Outer palea opened, showing the seven ribs.
5. Inner palea, strongly fringed with stout bristly hairs.
6. Ligule.
7. Ovarium, with the styles arising from below the summit.

Magnified.

For further description see page 110.

Bromus mollis, Linn., Smith, Hooker, With., Mackay, Koch, Kunth. *Serrafalcus mollis*, Parlatore, Babington.

PLATE CXVI.



Bromus mollis.

P. Parnell, M.D. del^t et sculp^t

Printed by J. [illegible]

Published by W^m Blackwood & Sons Edinburgh & London.

BROMUS MOLLIS (variety) OVALIS.

Soft Oval Brome-Grass.

Plate CXVII.

This variety differs from the preceding, in the spikelets being smaller, of an oval form, and the large glume rather longer in proportion, the apex of which being situated half-way between the base of the glume, and a little beyond the *third* floret on the same side, (see Fig. 1.)

It has frequently been confounded with *Bromus racemosus* (variety) *subsecalinus,* Plate CXX., to which it bears a great resemblance; but the hairy spikelets and the absence of minute teeth on the upper part of the middle rib of the glumes and florets will readily distinguish it.

It is a grass frequently met with throughout Britain, growing on dry, barren, sandy ground. In a dwarf state it might possibly be the *Bromus nanus* of Weigel, or *Bromus mollis,* var. β, in Hooker's British Flora. Of no important agricultural use.

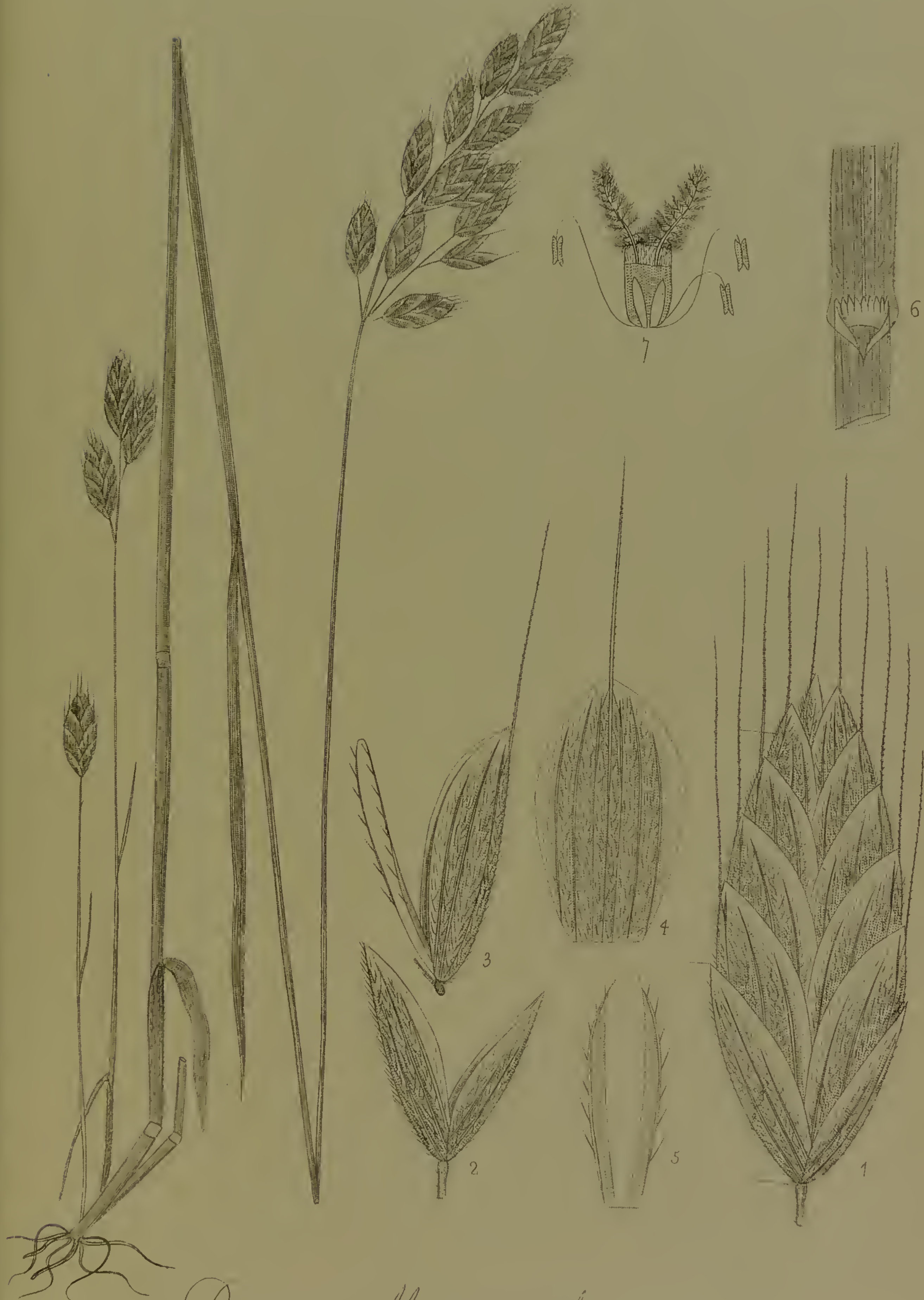
Flowers early in June.

Explanation of Plate CXVII. *Bromus mollis* (variety) *ovalis,* natural size.

Fig. 1. Spikelet, showing the two glumes and ten florets.
2. Glumes.
3. Second Floret, showing the paleæ, with an awn rather shorter than its palea.
4. Outer palea opened, showing the seven ribs.
5. Inner palea, fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

} Magnified.

PLATE CXVII.



Bromus mollis (var.) ovalis

R. Parnell, M.D. del.t et sculp.

Printed by J. Gellatly.

Published by Wm. Blackwood & Sons. Edinburgh & London.

Bromus mollis (variety) pratensis.

Soft Long-glumed Brome-Grass.

Plate CXVIII.

This variety is distinguished from the two preceding in the spikelets not being quite so hairy, the hairs somewhat shorter, and the apex of the large glume being situated half-way between the base of the glume and the summit of the fourth floret on the same side, (see Fig. 1); the outer palea is also more acute, and longer in proportion to its breadth, (see Fig. 4.)

Care must be taken so as not to confound this grass with *Bromus racemosus*, figured in the next plate; the hairy spikelets and toothless glumes, however, will readily distinguish it. The plant figured in the English Botany, p. 920, under the name of *Bromus pratensis*, is undoubtedly the same as the one here noticed.

It is distinguished from *Bromus commutatus,* Plate CXXIV., in being slightly hairy, and in the apex of the large glume being situated half-way between the base of the glume and the summit of the fourth floret on the same side;—while in *Bromus commutatus* the spikelets are not hairy, and the apex of the large glume is situated half-way between the base of the glume and the summit of the *second* floret on the same side.

It is frequently met with both in England and Scotland, growing on poor ground, but is not so common as the two preceding. It is not relished by cattle, and produces a scanty supply of herbage.

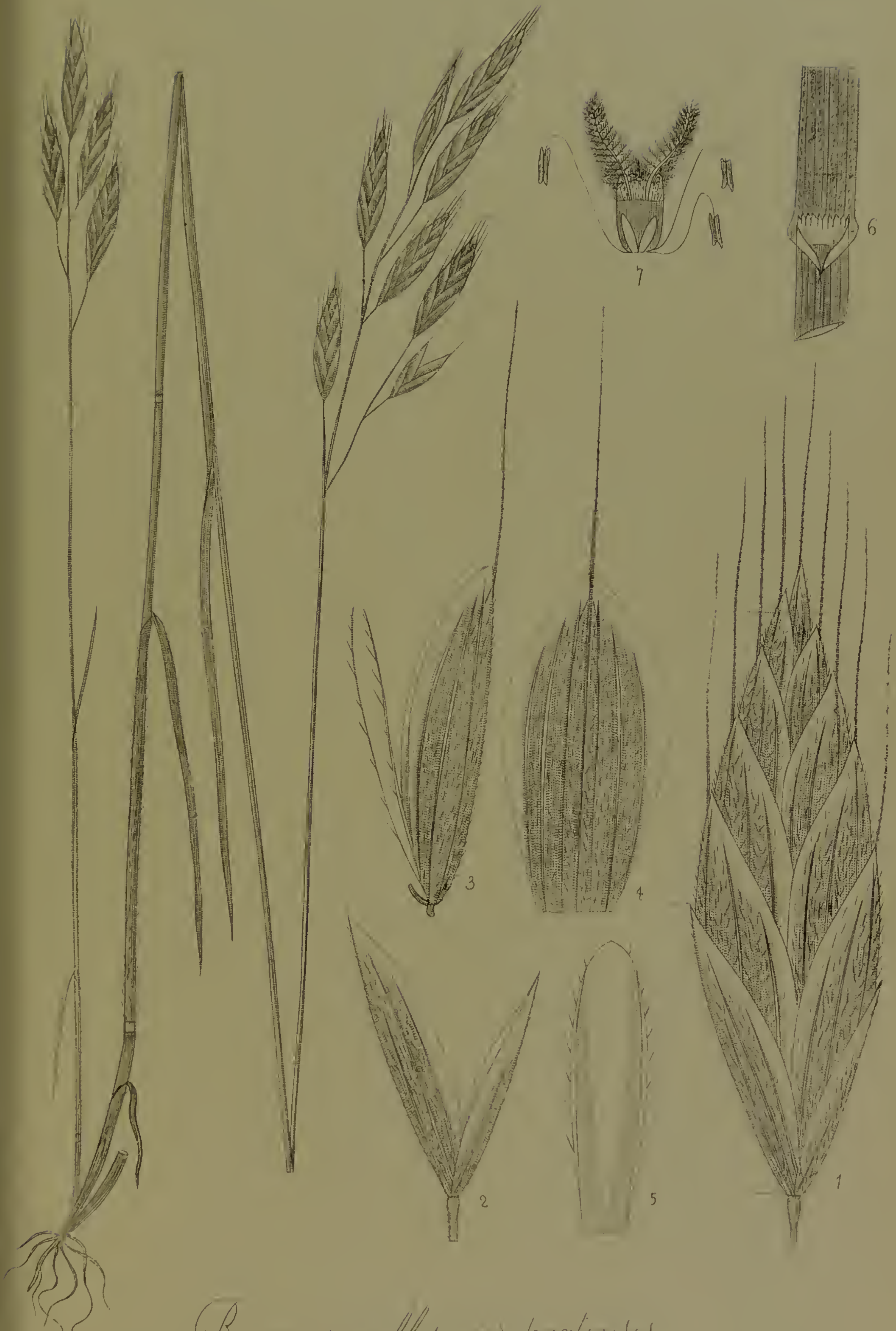
Flowers early in June.

Explanation of Plate CXVIII. *Bromus mollis* (variety) *pratensis*, natural size.

Fig. 1. Spikelet, showing the two glumes and nine florets.
2. Glumes hairy.
3. Floret, showing the two paleæ.
4. Outer palea opened, showing the seven ribs.
5. Inner palea fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.

PLATE CXVIII.



Bromus mollis (var) pratensis

R. Parnell. M.D. delᵗ et sculpᵗ

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BROMUS RACEMOSUS.

Smooth Brome-Grass.

Plate CXIX.

This grass is distinguished by the spikelets not being hairy, the middle *ribs* of the glumes minutely toothed on the upper half, (see Fig. 2,) and the *apex* of the large glume situated half-way between the base of the glume and the summit of the *third* floret on the same side, (see Fig. 1.)

It is very easily distinguished from *Bromus secalinus, Bromus commutatus, Bromus arvensis, Bromus patulus,* and *Bromus squarrosus* by the comparative length of the large glume.

Sir William Hooker, in his British Flora, is of opinion that this species is scarcely different from *Bromus mollis*, except in being more glabrous. I may here mention, however, that, independent of absence of hairs on the spikelets, the outer palea is broader, and, when opened, its upper margins form an obtuse angle, (see Fig. 4), and the middle ribs of the glumes and florets are minutely toothed on their upper part;—while in *Bromus mollis* the outer palea is not quite so broad and rather more rounded on its upper margins, and the middle ribs of the glumes and florets have no teeth.

For further description see page 111.

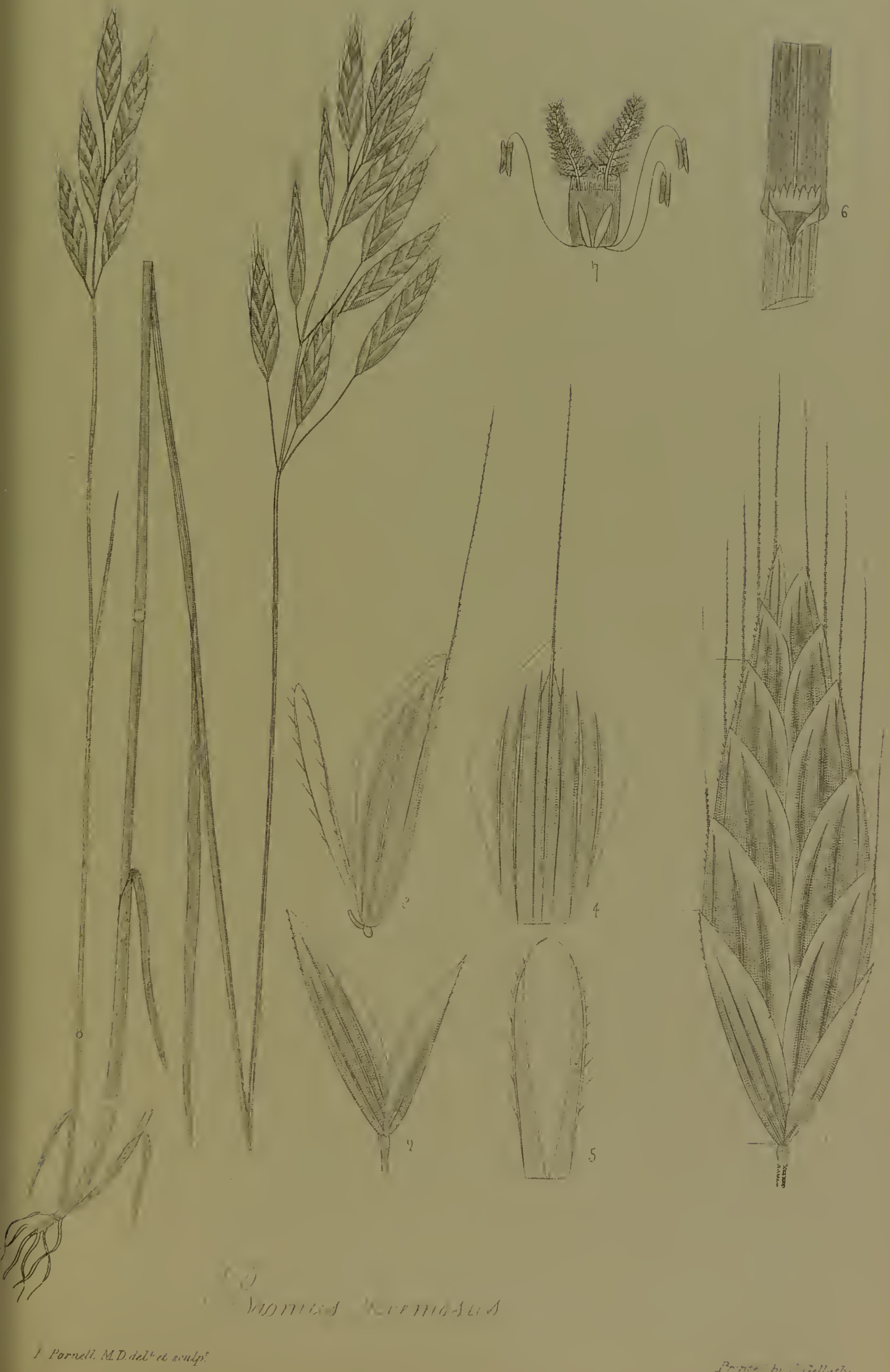
Explanation of Plate CXIX. *Bromus racemosus,* natural size.

Fig. 1. Spikelet, showing the two glumes and ten florets.
2. Glumes.
3. Floret, showing the outer and inner paleæ.
4. Outer palea opened, showing the seven ribs.
5. Inner palea fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.

Bromus racemosus, Linn., Hooker, Smith, Kunth, With. *Serrafalcus racemosus*, Parlatore, Babington.

PLATE CXIX.



Bromus Racemosus

J. Parnell, M.D. del^t et sculp^t

Printed by J. Gellatly.

Published by W^m Blackwood & Sons Edinburgh & London

Bromus racemosus (variety) subsecalinus.

Smooth Oval Brome-Grass.

Plate CXX.

This variety differs from the preceding, merely in the spikelets being smaller and of a more oval form. It is very liable to be mistaken for the following species, (*Bromus secalinus,*) from which it is distinguished in the outer palea when opened forming an obtuse angle on the upper half, and the apex of the large glume being situated half-way between the base of the glume and a little beyond the summit of the third floret on the same side;—while in *Bromus secalinus* the upper half of the outer palea is very much rounded, and the apex of the large glume is half-way between the base of the glume and the summit of the second floret on the same side.

It is a variety found growing with the preceding, and equally common.

It is a very inferior grass for agricultural purposes.

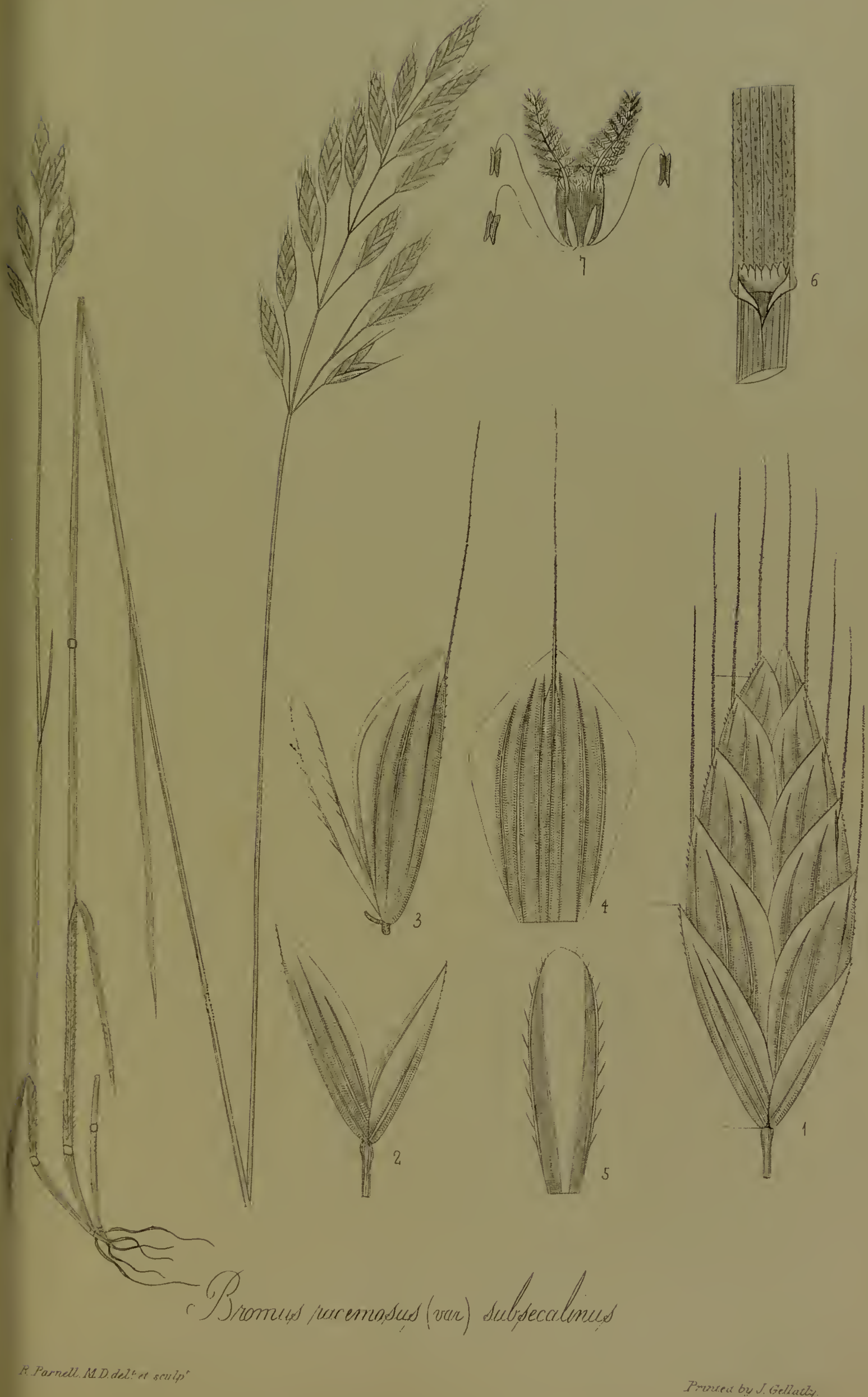
Flowers early in June.

The accompanying figure was drawn from a specimen gathered near Edinburgh.

Explanation of Plate CXX. *Bromus racemosus* (variety) *subsecalinus,* natural size.

Fig. 1. Spikelet, showing the two glumes and nine florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea opened, showing the seven ribs.
5. Inner palea fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.



Bromus racemosus (var) subsecalinus

R. Parnell. M.D. delt. et sculpt.

Printed by J. Gellatly.

Published by Wm. Blackwood & Sons. Edinburgh & London.

S

BROMUS SECALINUS.

Smooth Rye Brome-Grass.

Plate CXXI.

The description of this plant will be found in page 113.

The characters by which it is distinguished from its congeners, are, in the *apex* of the large glume being situated half-way between the base of the glume and the summit of the *second* floret on the same side (see Fig. 1); and in the *outer* palea being rounded on the upper margin with the breadth considerably greater than half its length (see Fig. 4.)

Bromus secalinus is distinguished from *Bromus commutatus* (Plate CXXIV.) in the *spikelets* being shorter and not so acute; *outer palea* rounded on the upper margin, with the breadth considerably greater than half its length (Fig. 4.);—while in *Bromus commutatus* the spikelets are lanceolate; *outer palea* forming an obtuse angle on the upper half, with the breadth equal only to *half* its length.

Bromus secalinus is distinguished from *Bromus arvensis* (Plate CXXVI.) in the *outer* palea being considerably broader, with the upper margin more obtuse (see Fig. 4); *inner palea* shorter than the outer; and all the florets much longer than their awns;—while in *Bromus arvensis* the *outer* palea is twice as long as broad, with the upper margin forming an obtuse angle (Fig. 4.); *inner palea* equal in length to the outer; and all the florets, except the lowermost, shorter than their awns. The anthers also are much longer.

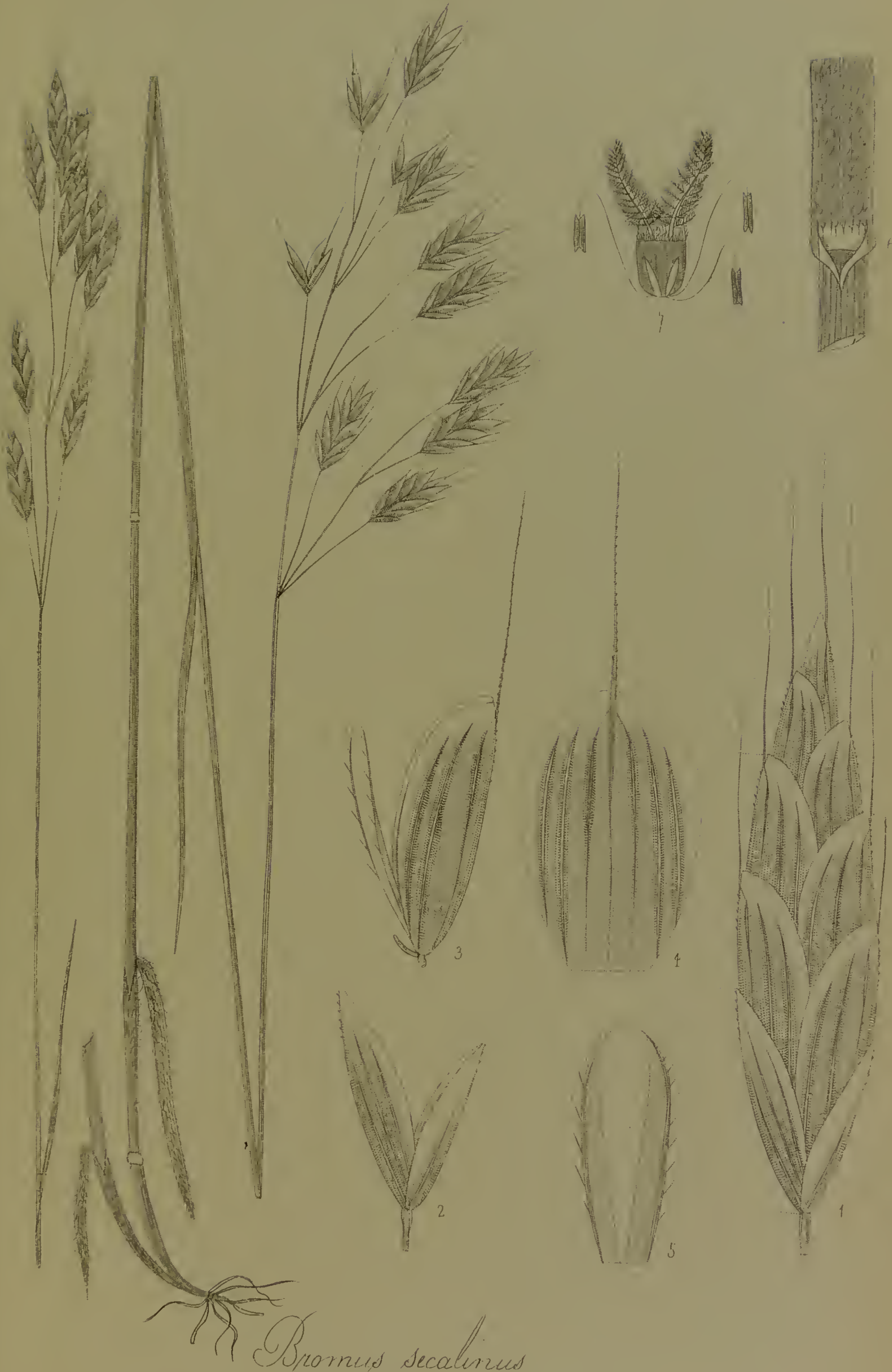
Bromus secalinus is distinguished from *Bromus patulus* and *Bromus squarrosus* in the *outer* palea having seven ribs instead of nine, with the superior margin rounded instead of forming an obtuse angle. There are many other characters which could be enumerated, but these will be found sufficient at all times to distinguish the species.

Explanation of Plate CXXI. *Bromus secalinus*, natural size.

Fig. 1. Spikelet, showing the two glumes and seven florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea, showing the seven ribs.
5. Inner palea fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.

PLATE CXXI.



Bromus secalinus

R. Parnell. M.D. del^t et sculp^t

Printed by J. Gellatly

Published by W^{m} Blackwood & Sons. Edinburgh & London.

BROMUS SECALINUS (variety) VULGARIS.

Pendulous Rye Brome-Grass.

Plate CXXII.

This grass often grows to the height of three feet or more. The panicle at first is erect, bearing close compact spikelets with the margins of the florets overlapping. As the seeds approach to maturity the panicle droops to a side, the spikelets become compressed and spreading, with the margins of the florets rolled in, thereby showing the rachis and the insertions of the florets. The spikelets are not hairy, the glumes toothed on the upper half of their keels. Outer palea seven-ribbed, the three central ones the most indistinct. Awn much shorter than the palea, never exceeding half its length. The apex of the large glume is half-way between the base of the glume and the summit of the second floret on the same side. The sheaths and leaves are covered with soft downy-like hairs.

This variety differs from the preceding, in the spikelets being larger, and when in seed heavier and consequently more pendulous; the outer palea less obtuse; and the awns much shorter.

It is a frequent plant in France and Germany, and is occasionally met with in this country growing among corn.

In the young state it might be mistaken for *Bromus commutatus*, (Plate CXXIV.) from which it is distinguished by the awns being shorter and the outer palea broader, twice the breadth considerably more than equals its length;—while in *Bromus commutatus* twice the breadth of the outer palea exactly equals its length. In the more advanced stage the two plants become very distinct, as seen in the figures.

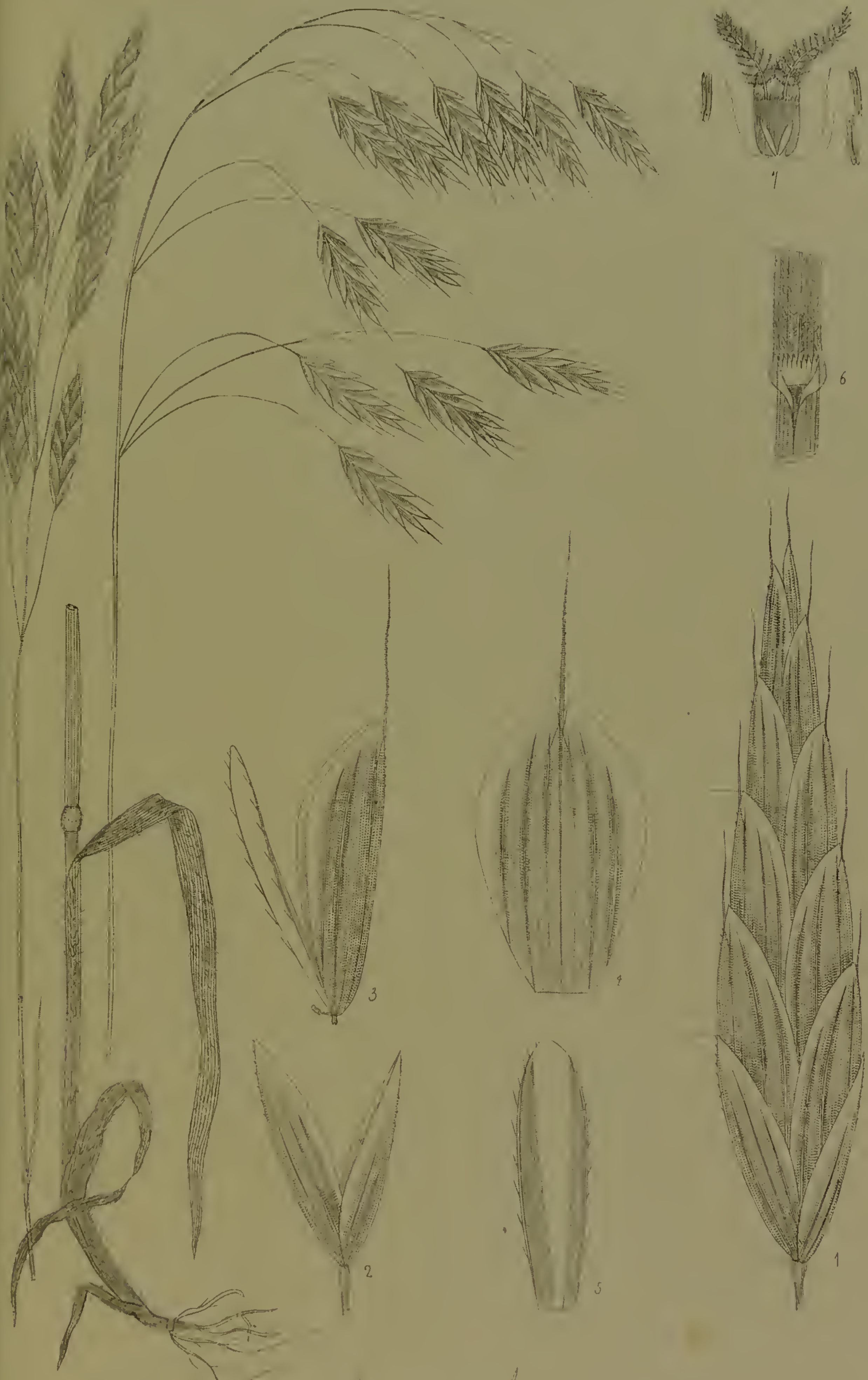
Flowers in the middle of June, and ripens its seed in the first week of July.

A very inferior grass for agricultural purposes.

The accompanying figure was drawn from a specimen gathered near Edinburgh.

Explanation of Plate CXXII. *Bromus secalinus* (variety) *vulgaris*, natural size.

PLATE CXXII



Bromus secalinus (var.) vulgaris

R. Parnell. M.D. del.t et sculp.t

Printed by . Gellatly.

Published by Wm Blackwood & Sons Edinburgh & London

Fig. 1. Spikelets, showing the two glumes and nine florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea opened, showing the seven ribs.
5. Inner palea fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.

BROMUS SECALINUS (variety) VELUTINUS.

Downy Rye Brome-Grass.

Plate CXXIII.

This variety is distinguished from the two preceding in the glumes and florets being covered with soft downy-like hairs, and the outer palea not so broad and less obtuse.

In its early stage of growth it bears all the appearance of a hairy variety of *Bromus commutatus,* from which it is with difficulty distinguished, but, as the seeds advance to maturity, the spikelets spread, and the margins of the florets become inflexed, assuming all the character of a *secalinus,* which so well marks the species.

It is readily distinguished in all its stages of growth from *Bromus mollis* in the apex of the large glume being situated midway between the base of the glume and near the summit of the second floret on the same side;—while in *Bromus mollis* the apex of the large glume is midway between the base of the glume and the summit of the third floret or beyond on the same side.

As some of the species of this genus have been enveloped in such a mass of confusion, it is difficult to determine their correct synonyms. Koch states this plant to be the *Bromus velutinus* of Smith, but, judging from Smith's description, they certainly bear very different characters. In the one the spikelets spread conspicuously, and the awns are much shorter than their florets;—while in the other the spikelets are close and the awns are equal in length to their florets.

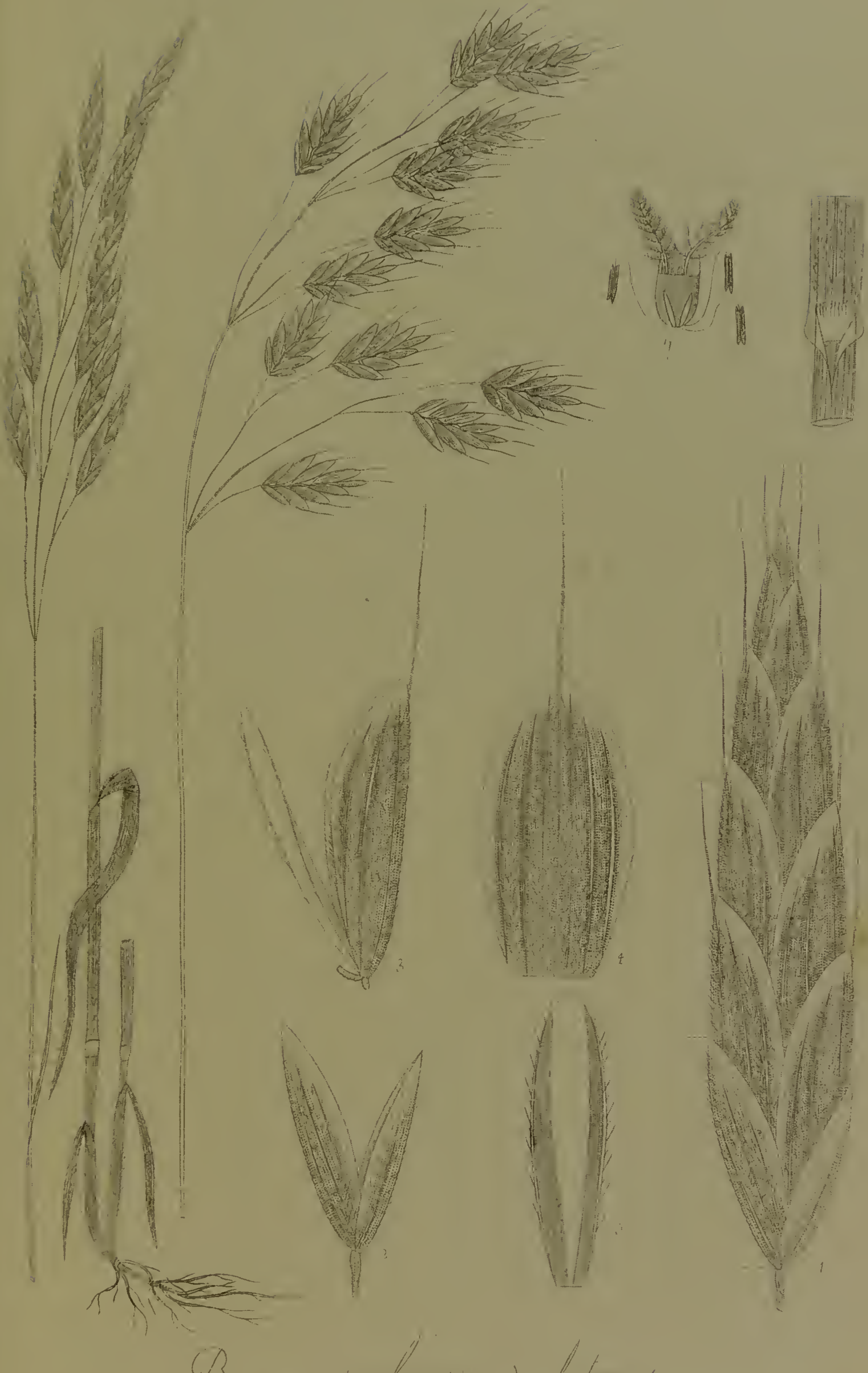
This grass grows in the same situations as the preceding, but in no fixed station, and flowers about the same period.

The accompanying figure was drawn from a specimen gathered in Lanarkshire.

Explanation of Plate CXXIII. *Bromus secalinus* (variety) *velutinus,* natural size.

Fig. 1. Spikelet, showing the two glumes and nine florets.
2. Glumes hairy.
3. Floret, showing the two paleæ.
4. Outer palea, showing the seven ribs.
5. Inner palea fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.



Bromus secalinus (var) velutinus

R Parnell. M.D. del.t et sculp.t

Printed by [illegible]

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BROMUS COMMUTATUS.

Taper Field Brome-Grass.

Plate CXXIV.

This grass is the same as the one previously described in page 115, and figured in Plate XLIX. under the name of *Bromus arvensis*, which ought to have been named *Bromus commutatus.** It is distinguished from the *Bromus arvensis* of Linnæus, (Plate CXXVI.,) in the *inner palea* being shorter and more obtuse, not reaching further up than to the base of the awn; *awns* not so long as their florets; and the *anthers* small;—whereas in *Bromus arvensis* the *inner palea* is equal in length to the outer palea; *awns* longer than their florets, except the lowermost; and the *anthers* about four times as long as broad.

Bromus commutatus is distinguished from *Bromus patulus* (Plate CXXVII.) in the *outer palea* having seven ribs, and all the *florets* longer than their awns;—while in *Bromus patulus* the *outer palea* has nine ribs; and all the *florets* are shorter than their awns, except the lowermost.

Bromus commutatus is distinguished from *Bromus squarrosus* (Plate CXXVIII.) in the *outer palea* being twice as long as broad, and having seven ribs; *awns* erect;—whereas is *Bromus squarrosus* the *outer palea* is not twice as long as broad, and has nine ribs; *awns* divaricating, and arise further down from the summit of the outer palea.

The accompanying figure was drawn from a specimen gathered near Edinburgh.

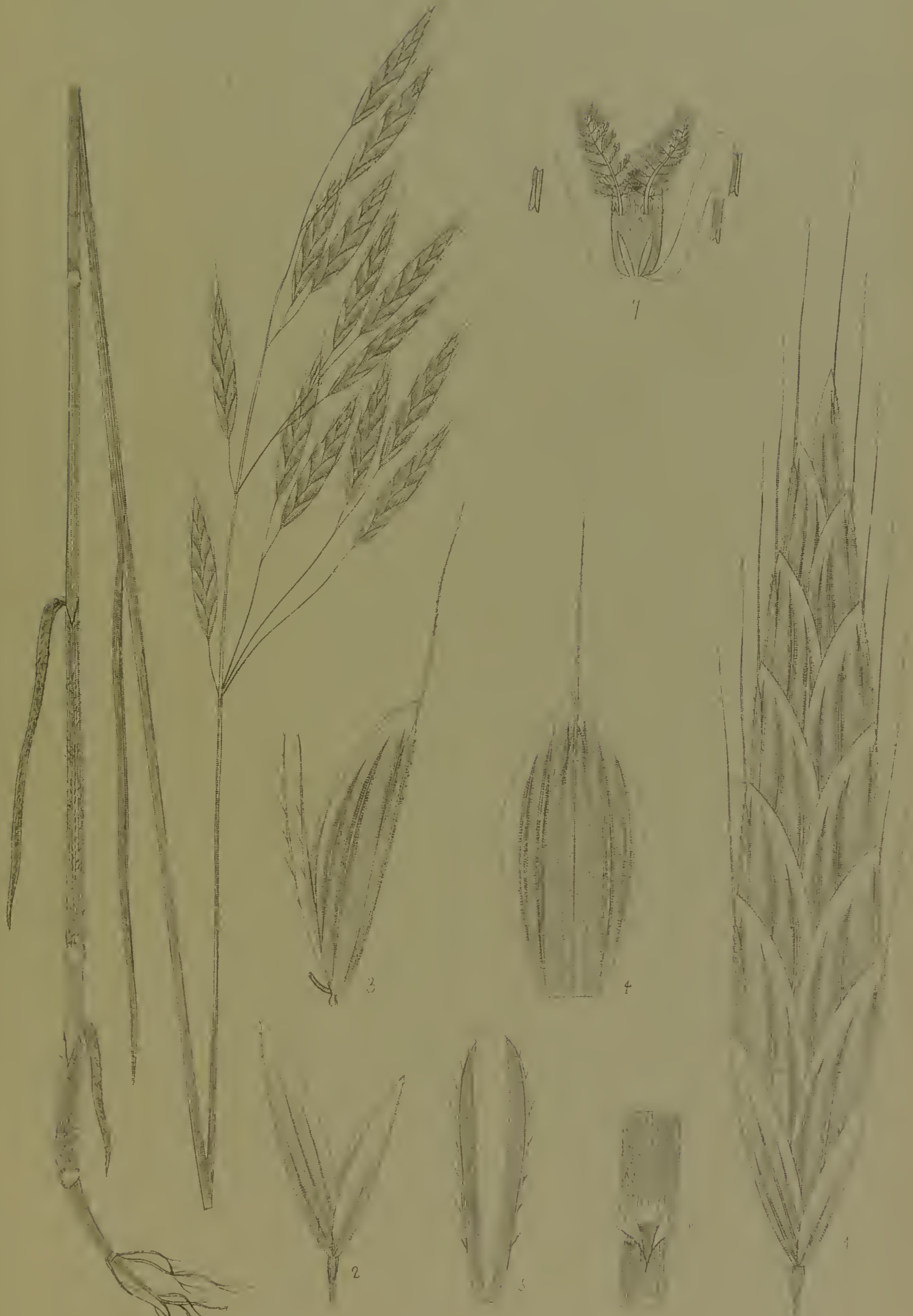
Explanation of Plate CXXIV. *Bromus commutatus*, natural size.

Fig. 1. Spikelet, showing the two glumes and eleven florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea opened, showing the seven ribs.
5. Inner palea fringed.
6. Ligule of upper sheath.
7. Ovarium, pistils, stamens, and scales.

Magnified.

Bromus commutatus, Schrader, Koch. *Serrafalcus commutatus*, Parlatore, Babington.

* See a valuable paper on the Bromi, by Mr Watson, in Lond. Journ. Bot., i. 82.



Bromus commutatus

Parnell M.D. delt et sculpt

Printed by Gellatly

Published by Wm Blackwood & Sons. Edinburgh & London

Bromus commutatus (variety) multiflorus.

Large Taper-Field Brome-Grass.

Plate CXXV.

This variety differs from the preceding in being a larger plant; the spikelets longer; the outer palea broader in proportion to its length; and the apex of the large glume being situated half-way between the base of the glume and a little beyond the summit of the second floret on the same side. In other respects the two plants are similar.

It is distinguished from *Bromus patulus,* the only species it is likely to be confounded with, in the outer palea having seven ribs and the awn shorter than the paleæ;—while in *Bromus patulus* the outer palea has nine ribs, and the awn is longer than the palea.

It is found occasionally in the neighbourhood of Edinburgh, but by no means common.

Flowers about the middle of June, and ripens its seed early in July.

It is a grass that can be recommended for hay, provided it be cut during the period of its flowering, as the root produces many stems which grow from three to four feet high. When in seed the stems become hard, and possess then but little nutritive matter.

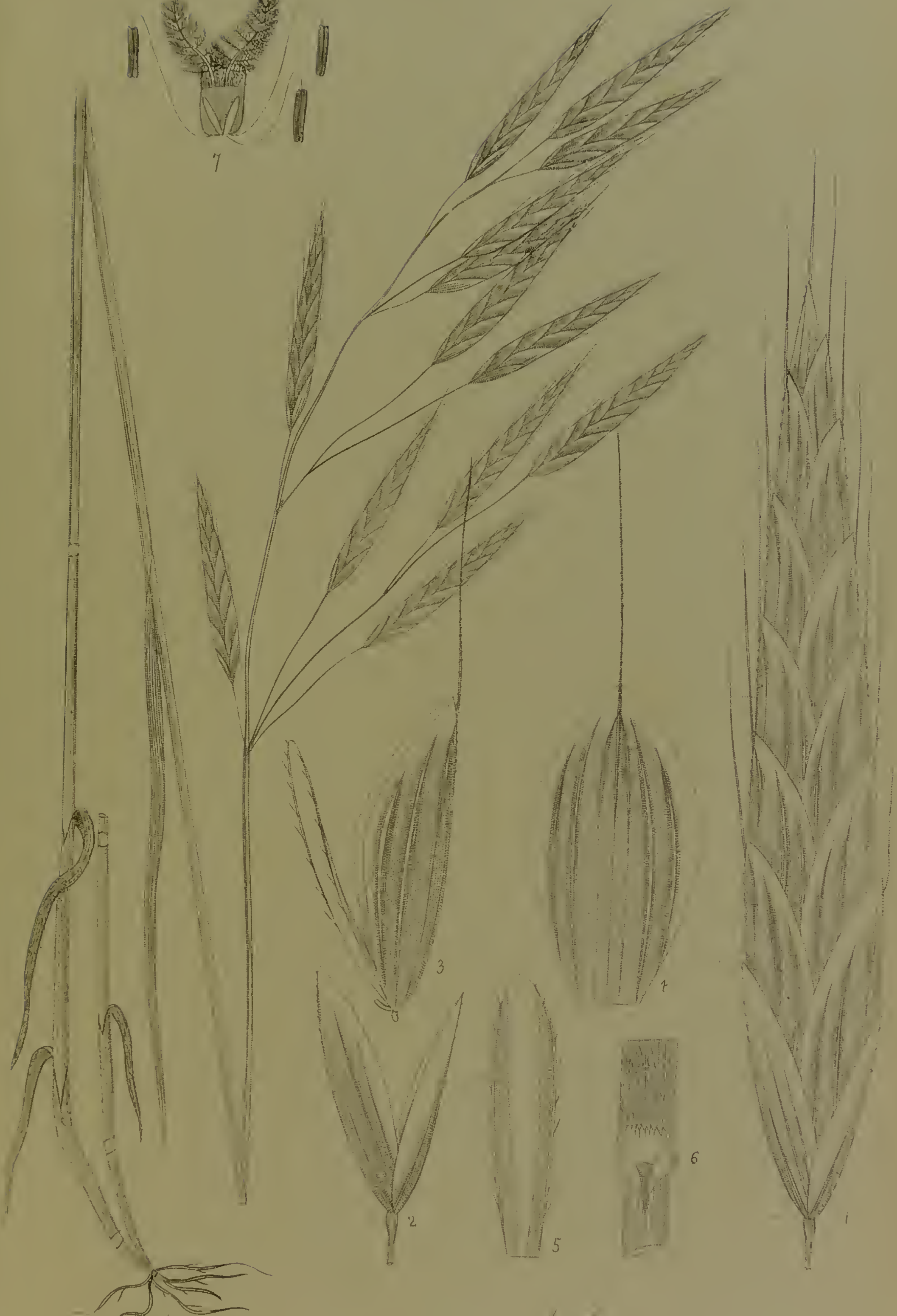
The accompanying figure was drawn from a specimen gathered in a grass field near Granton.

Explanation of Plate CXXV. *Bromus commutatus* (variety) *multiflorus*, natural size.

Fig. 1. Spikelet, showing the two glumes and twelve florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea opened, showing the seven ribs.
5. Inner palea fringed.
6. Ligule of upper sheath.
7. Ovarium, pistils, stamens, and scales.

Magnified.

PLATE CXXV.



Bromus commutatus (var.) multiflorus

R. Parnell. M.D. del^t et sculp^t

Published by W^m Blackwood & Sons Edinburgh & London

Bromus arvensis.

Long-anthered Brome-Grass.

Plate CXXVI.

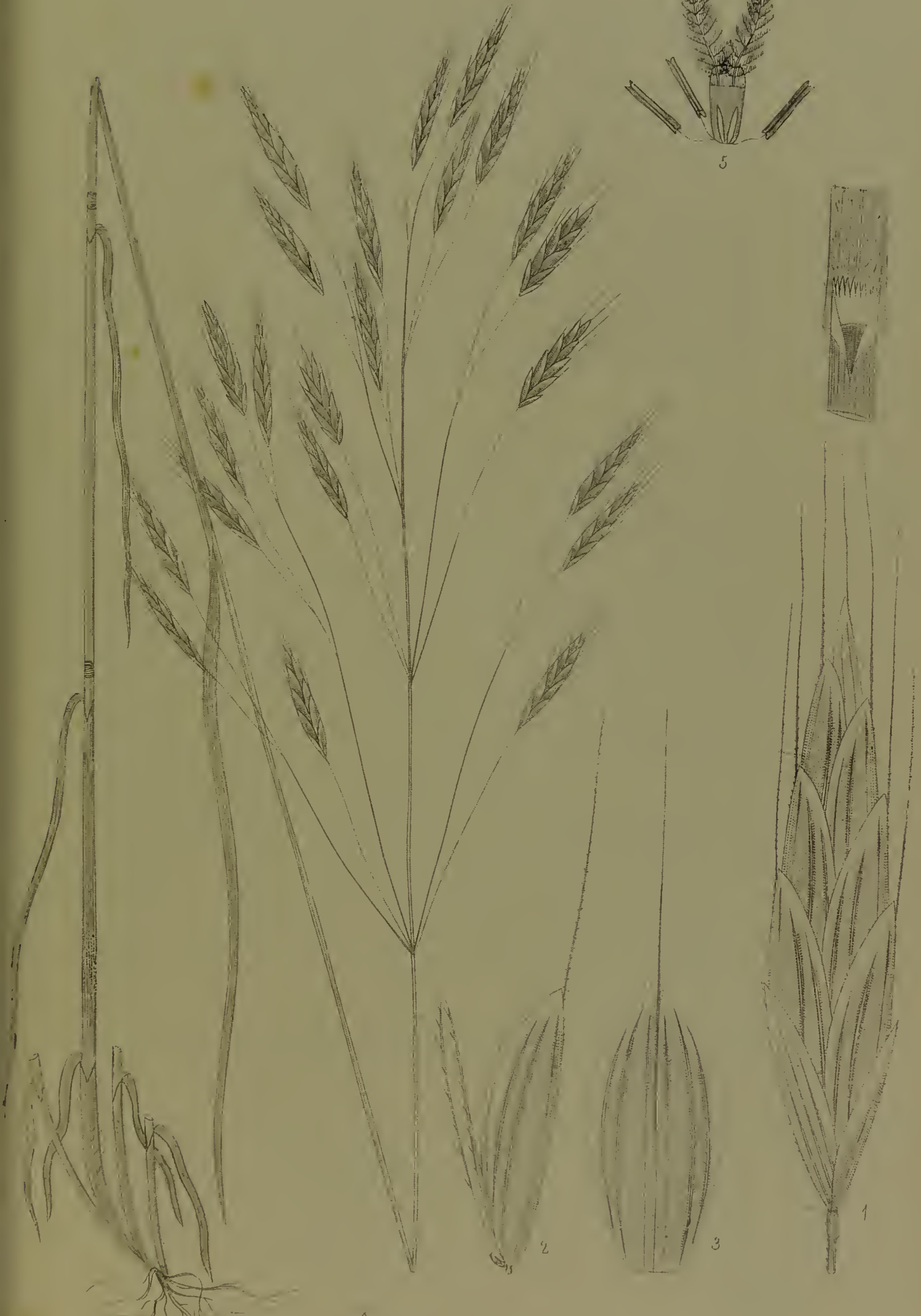
Specific Characters.—Panicle spreading. Paleæ equal. Outer palea seven-ribbed. Anthers four times as long as broad.

Description.—Root annual, fibrous, producing many stems, from nine to eighteen inches in length. *Stems* erect, round, hard, nearly solid, smooth except just below the panicle; bearing four or five leaves with striated sheaths shorter than their leaves, the upper sheath smooth or nearly so, the lower ones soft and pubescent. *Ligules* prominent and jagged. *Joints* usually four, more or less hairy, mostly covered by the sheaths. *Leaves* narrow, flat, rough on the margins, hairy, especially on the upper surface. *Inflorescence* simple panicled, at first erect, spreading when in fruit, and at length somewhat drooping; the rachis and branches rough. *Spikelets* linear-lanceolate, not hairy, usually of seven florets, awned, and frequently tinged with reddish-brown. *Apex* of large glume situated half-way between the base of the glume and the summit of the second floret on the same side, (see Fig. 1.) *Glumes* two, unequal, membranous at the margins, roughish on the keels; outer glume the smaller, three-ribbed; inner glume five-ribbed, and often somewhat awned by a slight elongation of the middle rib. *Florets* of two paleæ; the outer palea of lowermost floret longer than the glumes, seven-ribbed; the two marginal ribs the most distinct; the summit either bifid or entire, membranous, and glossy at the margins, the breadth equal to half its length, and, when opened, the margins above the centre exhibiting an obtuse angle, (Fig. 4); inner palea equal in length to the outer, thin, acute, white, and membranous, furnished with two green ribs fringed with stout white hairs. *Awns* erect, rough, slightly spreading when dry, arising from a little beneath the summit of the outer palea, and rather longer than the palea, except in the lowermost floret. *Ovarium* hairy on the summit. *Styles* two, short, arising from the side. *Stigmas* feathery. *Filaments* three, slender. *Anthers* long, notched at each end.

Obs.—Bromus arvensis is distinguished from *Bromus commutatus*

Bromus arvensis, Linnæus, Koch, Smith, Babington, (not Hooker.)

PLATE CXXVI



Bromus arvensis

R. Parnell. M.D. delt et sculp
Printed by [illegible]

Published by Wm Blackwood & Sons Edinburgh & London.

(Plate CXXIV.) in the *spikelets* being smaller; *inner palea* acute, equal in length to the outer; *anthers* about four times as long as broad; all the *florets* except the lowermost shorter than their awns; —whereas in *Bromus commutatus* the *spikelets* are longer; *inner palea* more obtuse, and not as long as the outer; *anthers* shorter; and all the *florets* longer than their awns.

Bromus arvensis is distinguished from *Bromus patulus* (Plate CXXVII.) in the *outer palea* having seven ribs; *inner palea* equal in length to the outer; *spikelets* smaller; and the *anthers* three times longer;—whereas in *Bromus patulus* the *outer palea* has nine ribs; *inner palea* shorter than the outer; *spikelets* longer; and the *anthers* much shorter.

This species of *Brome-grass* seems to have been first noticed in Britain by Sherard, who gathered specimens at Southampton, and a characteristic figure of the plant is given in Sowerby's English Botany. It is also accurately described by Sir Edward Smith in his English Flora. Sir William Hooker, however, in his British Flora, has described the *Bromus commutatus* of Schrader under the name of *Bromus arvensis*, and has therefore omitted to mention the true *Bromus arvensis* of Linnæus. It is occasionally found in England, but cannot be regarded as a true native any more than *Bromus commutatus* and *Bromus patulus*, which have no doubt found their way into this country through human agency.

It is a native of France, Germany, and Italy, where I have seen it growing plentifully in corn-fields and road sides, in the months of July and August. It is also found in Lapland, Norway, Sweden, and West Asia. It has not been noticed either in Scotland or Ireland.

Flowers in June and July, and ripens its seed about the middle of August.

The accompanying figure was drawn from a specimen sent me by Mr Gibson, who gathered it near Hebden Bridge, Yorkshire.

Explanation of Plate CXXVI. *Bromus arvensis*, natural size.

Fig. 1. Spikelet, showing the two glumes and seven florets. 2. Second floret, showing the two paleæ. 3. Outer palea opened, showing the seven ribs. 4. Ligule. 5. Ovarium, pistils, stamens, and scales.	Magnified.

BROMUS PATULUS.

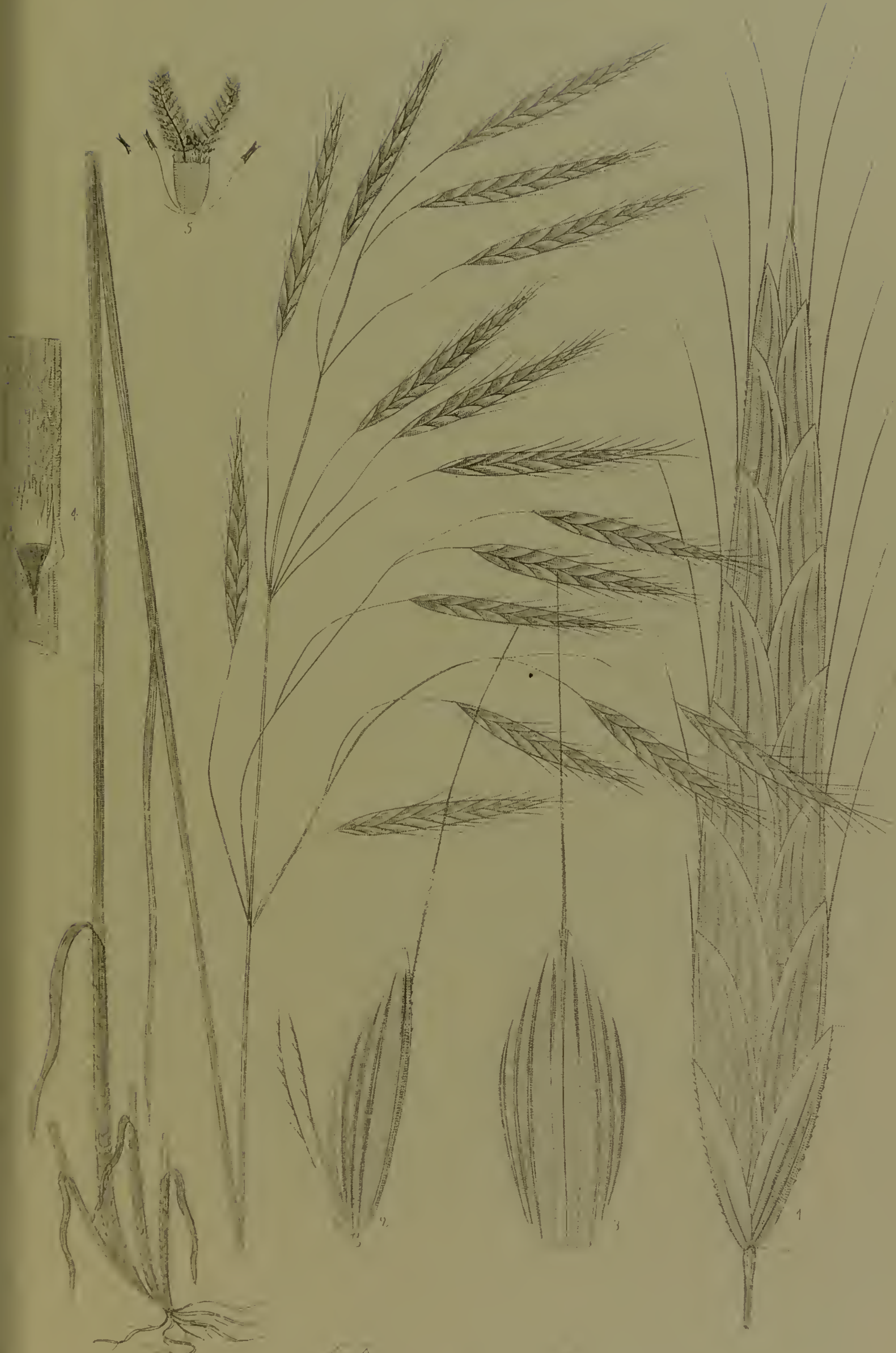
Patent Brome-Grass.

Plate CXXVII.

Specific Characters.—Panicle patent. Spikelets lanceolate. Outer palea nine-ribbed.

Description.—Root annual, fibrous. *Stem* erect, round, hard, nearly solid, smooth, except just below the panicle, scarcely polished, from nine inches to two feet or more high, bearing four or five leaves with striated sheaths shorter than their leaves; the upper sheath smooth, or nearly so, the lower sheaths soft and pubescent. *Ligules* prominent and ragged. *Joints* usually four, more or less hairy, mostly covered by the sheaths. *Leaves* flat, narrow, pointed, hairy, especially on the upper surface. *Inflorescence* simple panicled, at first erect, spreading when in fruit, and when in seed drooping to a side; the rachis and branches rough; the branches on the upper part arising in pairs or threes, and mostly in fives on the lower part. *Spikelets* lanceolate, not hairy, usually of fourteen awned florets, and two glumes; apex of large glume situated half-way between the base of the glume and the summit of the second floret on the same side. *Glumes* two, unequal, membranous at the margins, roughish on the keels; outer glume the smaller, three-ribbed; inner glume five-ribbed, and often somewhat awned by a slight elongation of the middle rib. *Florets* of two paleæ; the outer palea of lowermost floret longer than the glumes; nine-ribbed, the two marginal ribs the most distinct; it is either bifid or entire at the summit, membranous and glossy at the margins, twice as long as broad, and when opened the superior margins exhibit an obtuse angle. *Inner* palea not as long as the outer palea, reaching as far up as the base of the awn, thin, white, obtuse, membranous, furnished with two green marginal ribs fringed with stout, white hairs. *Awns* erect, rough, slightly spreading when dry, arising from a little below the summit of the outer palea, and rather longer than the palea except in the lowermost floret. *Ovarium* hairy on the summit. *Styles* two, short, arising from the side. *Stigmas* feathery. *Filaments* three, slender, short. *Anthers* small, notched at each end. *Scales* small.

Bromus patulus, Koch, Kunth.



Bromus mutabilis.

R. Parnell M.D. delt et sculpt

Published by W. Blackwood [illegible] Edinburgh [illegible]

Obs.—*Bromus patulus* is distinguished from *Bromus arvensis* (Plate CXXVI.) in the *spikelets* being longer; *outer palea* nine-ribbed; *inner palea* shorter than the outer, not reaching beyond the base of the awn; and the *anthers* much smaller;—whereas in *Bromus arvensis* the *spikelets* are smaller, of fewer florets; *outer palea* seven-ribbed; *inner palea* equal in length to the outer; and the *anthers* about four times as long as broad.

Bromus patulus is distinguished from *Bromus commutatus* (Plate CXXIV.) in the *outer* palea being nine-ribbed; all the *awns* longer than their florets except the lowermost one;—whereas in *Bromus commutatus* the *outer* palea is only seven-ribbed; and all the awns are shorter than their florets.

Bromus patulus is distinguished from *Bromus squarrosus* (Plate CXXVIII.) in the *spikelets* being of a more lanceolate form; *outer* palea twice as long as broad; *awn* arising from near the summit of the palea, and when dry but slightly spreading;—whereas in *Bromus squarrosus* the *spikelets* are of an oblong-lanceolate form; *outer palea* broader, twice the breadth more than equals its length by one-fourth; *awn* arising more remote from the summit of the palea, and when dry conspicuously divaricating.

Bromus patulus is distinguished from *Bromus asper* and *Bromus sterilis* in the larger glume having seven ribs instead of only three ribs.

This grass is not a true native. It grows near Hebden Bridge, where it was discovered by Mr Gibson, who sent me a specimen, and from which the accompanying figure was taken. It is a native of France and Germany. Grows in corn-fields and waste places. Of little agricultural importance.

Flowers in June.

Explanation of Plate CXXVII. *Bromus patulus*, natural size.

Fig. 1. Spikelet, showing the two glumes and fourteen florets. 2. Floret, showing the two paleæ. 3. Outer palea opened, showing the nine ribs. 4. Ligule. 5. Ovarium, pistils, stamens, and scales.	Magnified.

BROMUS SQUARROSUS.

Corn Brome-Grass.

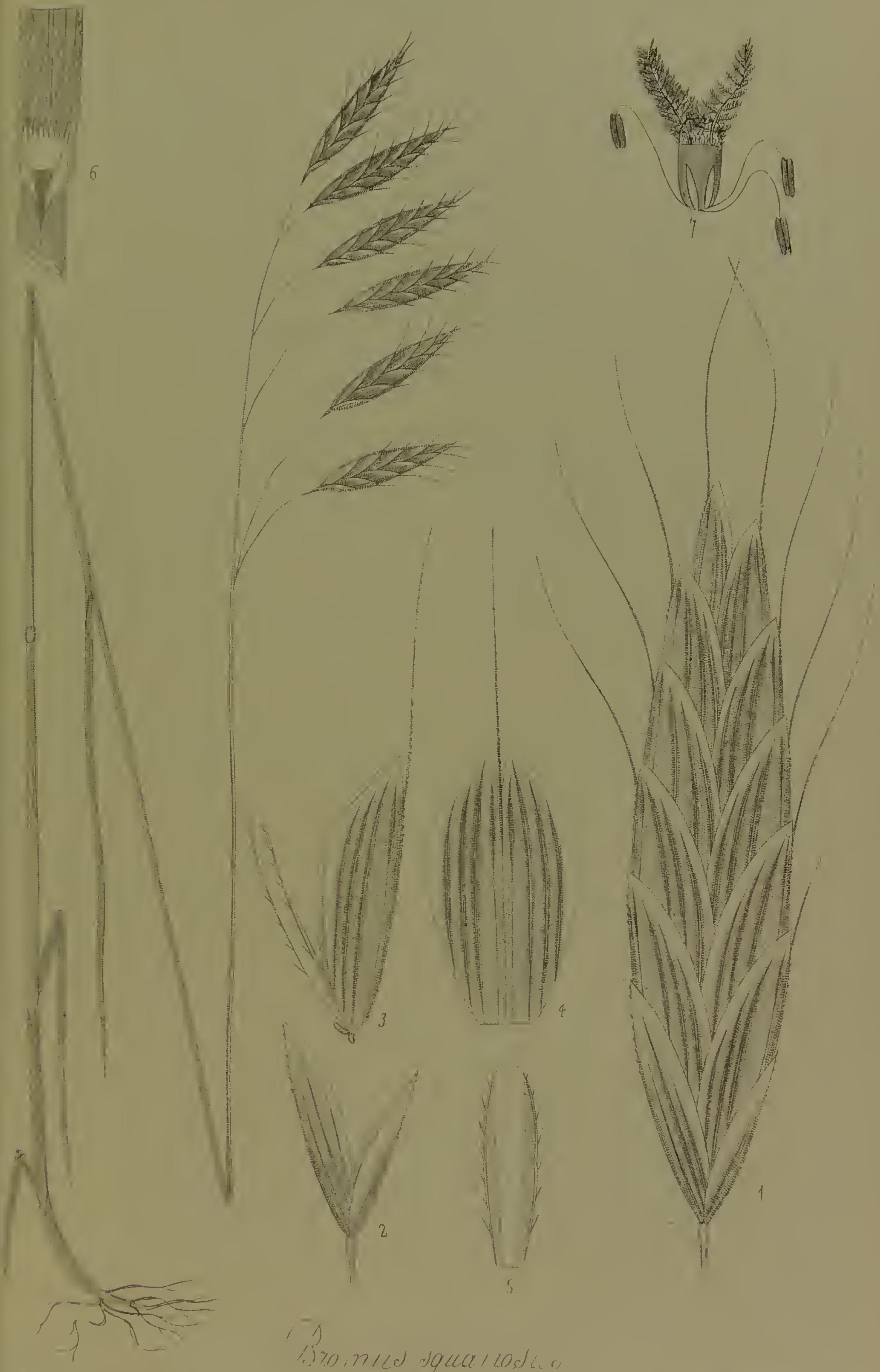
Plate CXXVIII.

Specific Characters.—Awns divaricating when dry. Outer palea nine-ribbed, twice the breadth greater than half its length.

Description.—Root annual, fibrous. *Stem* erect, hollow, round, smooth, striated and polished, from nine to eighteen inches high; bearing four or five leaves with striated sheaths shorter than their leaves; the upper sheath slightly roughish, the lower sheaths soft and pubescent. *Ligules* prominent and ragged. *Joints* usually four, the upper ones seldom covered by the sheaths. *Leaves* flat, narrow, linear-lanceolate, rough on both surfaces, especially when felt from point to base, the lower ones less harsh, and frequently with soft downy hairs. *Inflorescence* racemed, at first erect, at length drooping to a side, the rachis and branches rough. *Spikelets,* when young, oblong-lanceolate, in seed more oval and subcompressed, (not hairy,) usually of ten florets and two glumes, frequently tinged with reddish brown; apex of large glume situated half-way between the base of the glume and the summit of the second floret of the same side, (Fig. 1.) *Glumes* two, unequal, membranous at the margins, roughish on the keels; outer glume the smaller, three-ribbed; inner glume five-ribbed. *Florets* of two paleæ, the outer palea of lowermost floret longer than the glumes; nine-ribbed, the marginal ribs the most distinct; it is either bifid or entire at the summit, membranous and glossy at the margins, not twice as long as broad, and when opened the superior margins exhibit an obtuse angle; inner palea much shorter than the outer, not reaching further up than to the base of the awn, thin, obtuse, white and membranous, furnished with two green marginal ribs fringed with stout white hairs. *Awns* erect, rough, at length divaricating, arising from below the summit of the outer palea, and about the length of the palea; those of the two lowermost florets shorter than the palea. *Ovarium* hairy on the summit. *Styles* two, short, arising from the side.

Bromus squarrosus, Linn., Huds., Eng. Bot., Schrad., Koch, Kunth, Hooker, Smith, With., Lindley. *Serrafalcus squarrosus,* Babington.

PLATE CXXVIII.



Bromus squarrosus

Parnell, M.D. del.ᵗ et sculp. Printed by M'Kellar

Published by W^{m} Blackwood & Sons. Edinburgh & London.

Stigmas feathery. *Filaments* three, slender, short. *Anthers* very small, notched at each end.

Obs.—*Bromus squarrosus* is distinguished from *Bromus patulus* in the *spikelets* being of an oblong lanceolate form; *outer palea* broader, twice the breadth greater than its length; *awns*, when dry, divaricating very conspicuously, and arising from the outer palea about one-fourth from the summit;—whereas in *Bromus patulus* the *spikelets* are longer, of a lanceolate form; *outer palea* twice as long as broad; *awns* but slightly spreading, and arising from the outer palea much nearer the summit; the panicle larger and the branches more spreading. The two grasses are closely allied, but very distinct.

Bromus squarrosus is distinguished from *Bromus arvensis* in the *spikelets* being of a more oblong form; *outer* palea nine-ribbed, twice the breadth greater than its length; *inner palea* much shorter than the outer palea, not reaching further up than to the base of the awn; the *awns* divaricating;—whereas in *Bromus arvensis* the *spikelets* are linear, lanceolate; outer palea seven-ribbed, and twice as long as broad; inner palea as long as the outer palea, and the awns not divaricating.

Bromus squarrosus is distinguished from *Bromus commutatus* in the outer palea being nine-ribbed, and twice its breadth greater than the length; *awns* divaricating, arising from the outer palea, about one-fourth from the summit;—whereas in *Bromus commutatus* the *outer palea* is seven-ribbed, and twice as long as broad; *awns* not spreading, and arising from the outer palea much nearer the summit.

Bromus squarrosus is distinguished from *Bromus secalinus* in the outer palea being nine-ribbed, the upper half forming an obtuse angle; *awns* divaricating, arising from the outer palea, about one-fourth from the summit;—whereas in *Bromus secalinus* the outer palea is seven-ribbed, and rounded at the summit; *awns* straight, and arising from the outer palea much nearer to the summit.

Bromus squarrosus is distinguished very easily from *Bromus racemosus* and *Bromus mollis* in the *apex* of the large glume being half-way between the base of the glume and the summit of the second floret on the same side;—whereas in *Bromus racemosus* and *Bromus mollis* the *apex* of the large glume is half-way between its base and the summit of the third floret, or beyond.

The comparative length of the large glume is a character which can be strictly depended on in distinguishing several of the species of Bromi, but which appears to have been previously overlooked by botanists.

This grass is said to have been found in the counties of Essex, Kent, Surrey, and Somerset, but I have not myself had an opportunity of examining a British specimen. The plants sent me under the name of *Bromus squarrosus* have invariably proved to be some other species.

The accompanying figure was drawn from a foreign specimen in the possession of Dr Greville. It is a native of France, Germany, Italy, Spain, and Portugal.

Flowers in July, and ripens its seed in the middle of August. Of no material agricultural use.

Explanation of Plate CXXVIII. *Bromus squarrosus*, natural size.

Fig. 1. Spikelet, showing the two glumes and ten florets.
2. Glumes.
3. Floret, showing the two paleæ.
4. Outer palea, showing the nine ribs.
5. Inner palea fringed.
6. Ligule.
7. Ovarium, pistils, stamens, and scales.

Magnified.

CYNOSURUS ECHINATUS.

Rough Dog's-Tail-Grass.

Plate CXXIX.

The figure given of this grass in Plate XXVIII. is scarcely characteristic of the species, as having been drawn from a dried stunted specimen, gathered in Shetland. I therefore substitute the accompanying figure, which was taken from a recent plant gathered in the neighbourhood of Edinburgh.

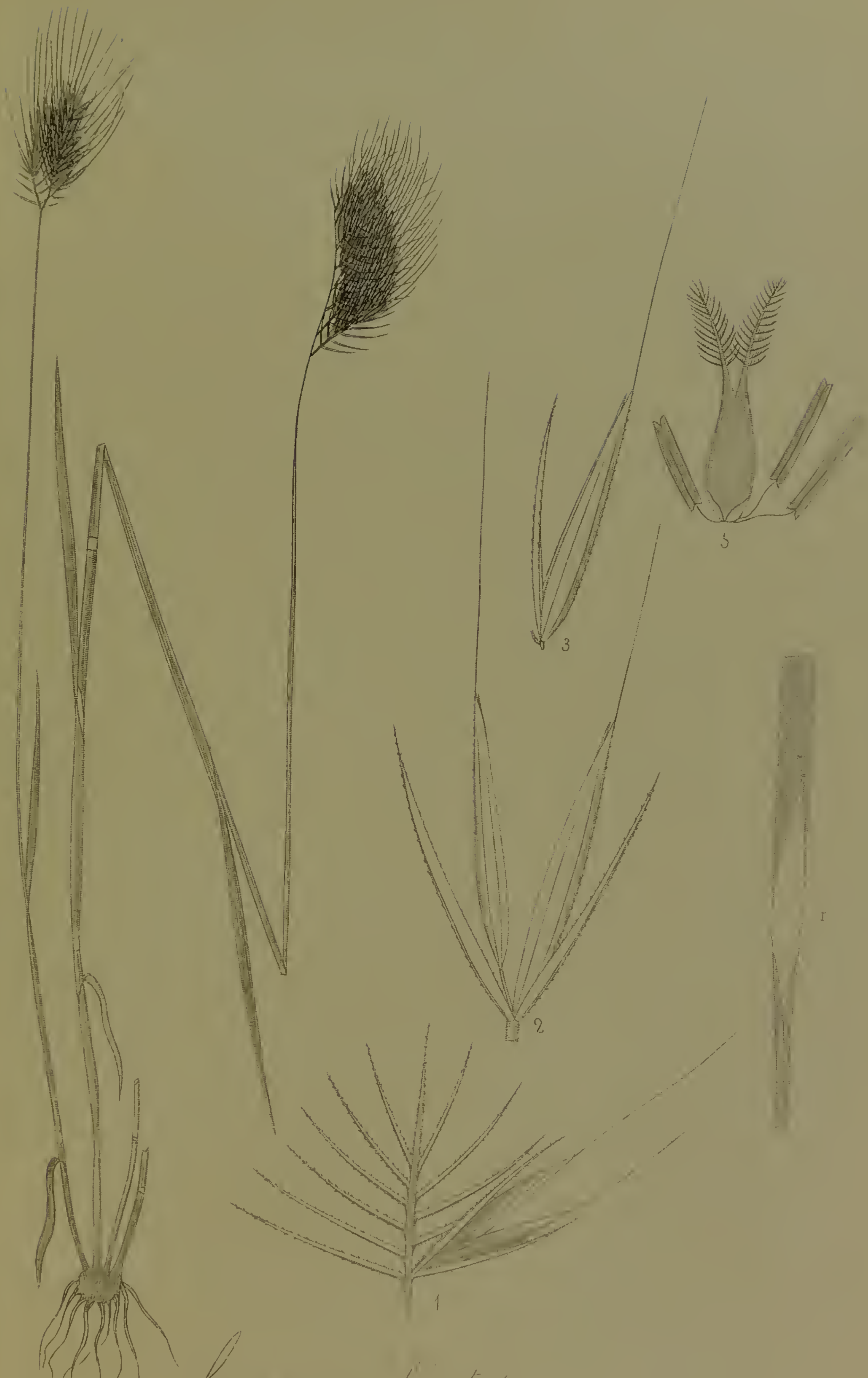
This grass was pointed out to me by Professor Graham growing in great profusion in an *Italian rye-grass* field near Granton. It sprung up in large tufts, producing several stems from one to three feet high, bearing panicles of luxuriant growth, often exceeding three inches in length, and were it not for the root being annual, it would rank among the superior agricultural grasses.

It was in full flower on the 22d of June. The seeds had been introduced from the south of France, mixed with those of the Italian rye-grass.

According to Mr Murphy, this grass has also recently been discovered in Ireland. It is occasionally met with in England, and is common in France, Germany, and Italy. The description will be found in page 66.

Explanation of Plate CXXIX. *Cynosurus echinatus,* natural size.

Fig. 1. Spikelet with the pectinated involucre.
2. Spikelet, showing the two glumes and two florets.
3. Floret, showing the two paleæ and long awn.
4. Ligule long and pointed.
5. Ovarium, pistils, stamens, and scales.
} Magnified.



Cynosurus echinatus

R. Parnell, M.D. delt et sculpt

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HORDEUM SYLVATICUM.

Wood-Barley.

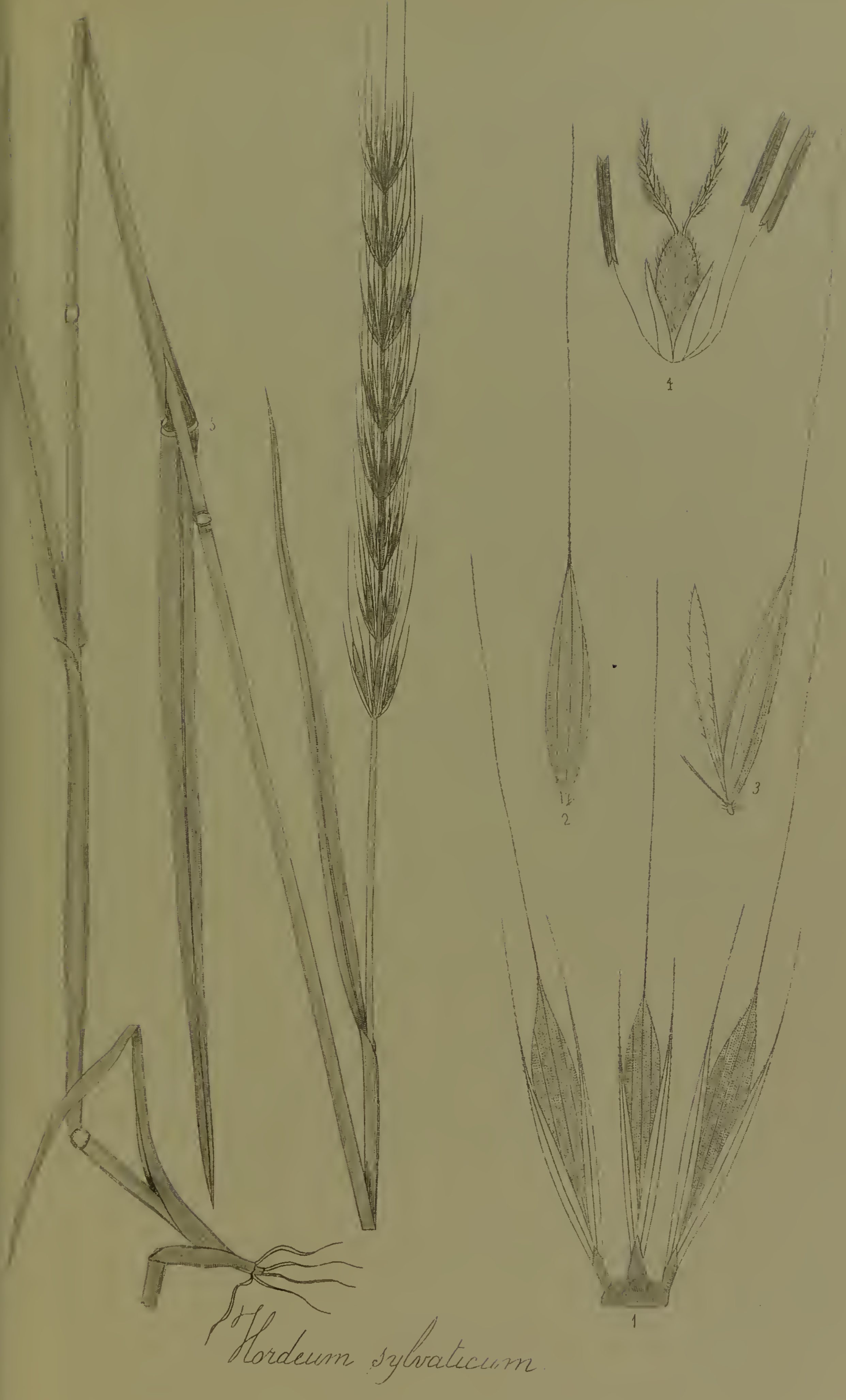
Plate CXXX.

Specific Characters.—Glumes of the middle spikelet not fringed. Awn of the floret of lateral spikelet extending considerably beyond the glumes.

Description.—Root perennial, fibrous, somewhat tufted, producing stems about two feet in length. *Stems* erect, round, hollow, nearly smooth, bearing four or five leaves, with roughish, striated sheaths; upper sheath longer than its leaf. *Ligule* of upper sheath short, and blunt, the length about equal to one-fourth the breadth. *Joints* usually four, the upper one situated about the centre of the stem, furnished with a few minute hairs, pointing downwards, which are more numerous a little below the joint. *Leaves* lanceolate, flat, sharp-pointed, rough on the edges and both surfaces, especially when felt from point to base. *Inflorescence* spiked. *Spike* two or three inches in length, linear, close and uniform; rachis rough, angular, toothed alternately on both sides, seven teeth within the space of an inch. *Spikelets* arranged in threes on each tooth of the rachis; each spikelet composed of one or two florets and two glumes. *Glumes* of equal lengths, parallel, dilated, three-ribbed, roughish, not fringed, terminating in a long rough awn. *Floret* of two paleæ, the outer palea awned, five-ribbed, rough, furnished at the base with a few short stout hairs. Inner palea about equal in length to the outer, with two ribs delicately fringed, and furnished at the base with a long bristle, about half the length of the palea. *Awn* of the outer palea rough, arising from the very summit, and rather longer than the palea. *Ovarium* hairy. *Styles* two, short. *Stigmas* somewhat feathery. *Filaments* three, slender. *Anthers* rather long, cloven at each end. *Seed* lanceolate, with a furrow along the upper side, firmly coated with both paleæ. *Scales* prominent, acute, hairy.

Hordeum sylvaticum is distinguished from *Hordeum murinum*, in the *glumes* of the middle spikelet not being fringed, (see Fig. 1), with *awns* not longer than the glumes;—whereas in *Hordeum muri-*

Hordeum sylvaticum, Huds., Knapp, Bab. *Elymus Europæus*, Linn., Smith, Hooker, Lind., Koch.



Hordeum sylvaticum

P. Parnell, M.D. delt et sculpt

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Published by Wm Blackwood & Sons, Edinburgh & London

num, the *glumes* of the middle spikelets are very conspicuously fringed and the *awns* are much longer than their glumes.

Hordeum sylvaticum is distinguished from *Elymus arenarius* in the *spikelets* being arranged in threes on each tooth of the rachis; *glumes* containing one, seldom two florets; *florets* with long awns;—whereas in *Elymus arenarius* the *spikelets* are arranged in pairs on each tooth of the rachis; *glumes* containing three florets; *florets* without awns.

This grass at first sight might be mistaken for a *Triticum,* but the fact of its having three spikelets situated on each tooth of the rachis, instead of only one, will readily distinguish it.

The broad, thin, and light green leaves, together with the length, is sufficient to indicate that this plant is a natural inhabitant of woods, thickets, and damp shady places, and that it contains less nutritive matter, and not so palatable to cattle as those grasses found in drier and more exposed situations.

It grows wild in many places in England, as in Oxfordshire, Bedford, Wilts, Herts, Bucks, Hunts, Denbigh, Derby, York, and Northumberland, but I am not aware of its having been found either in Ireland or Scotland. It is also a native of Norway, Sweden, France, Germany, Switzerland, and Italy.

Flowers in June, and ripens its seed about the middle of August.

The accompanying figure was drawn from a specimen gathered in Yorkshire.

Explanation of Plate CXXX. *Hordeum sylvaticum*, natural size.

Fig. 1. Three spikelets on a tooth of the rachis, each spikelet with two glumes and one floret.
2. One of the florets removed from the glumes.
3. Lateral view of one of the florets, showing the two paleæ and a long bristle from the base.
4. Ovarium, pistils, stamens, and scales.
5. Ligule natural size.

} Magnified.

ELYMUS GENICULATUS.

Pendulous Sea Lime-Grass.

Plate CXXXI.

Specific Characters. — Spike bent perpendicularly downwards. Glumes longer than the florets.

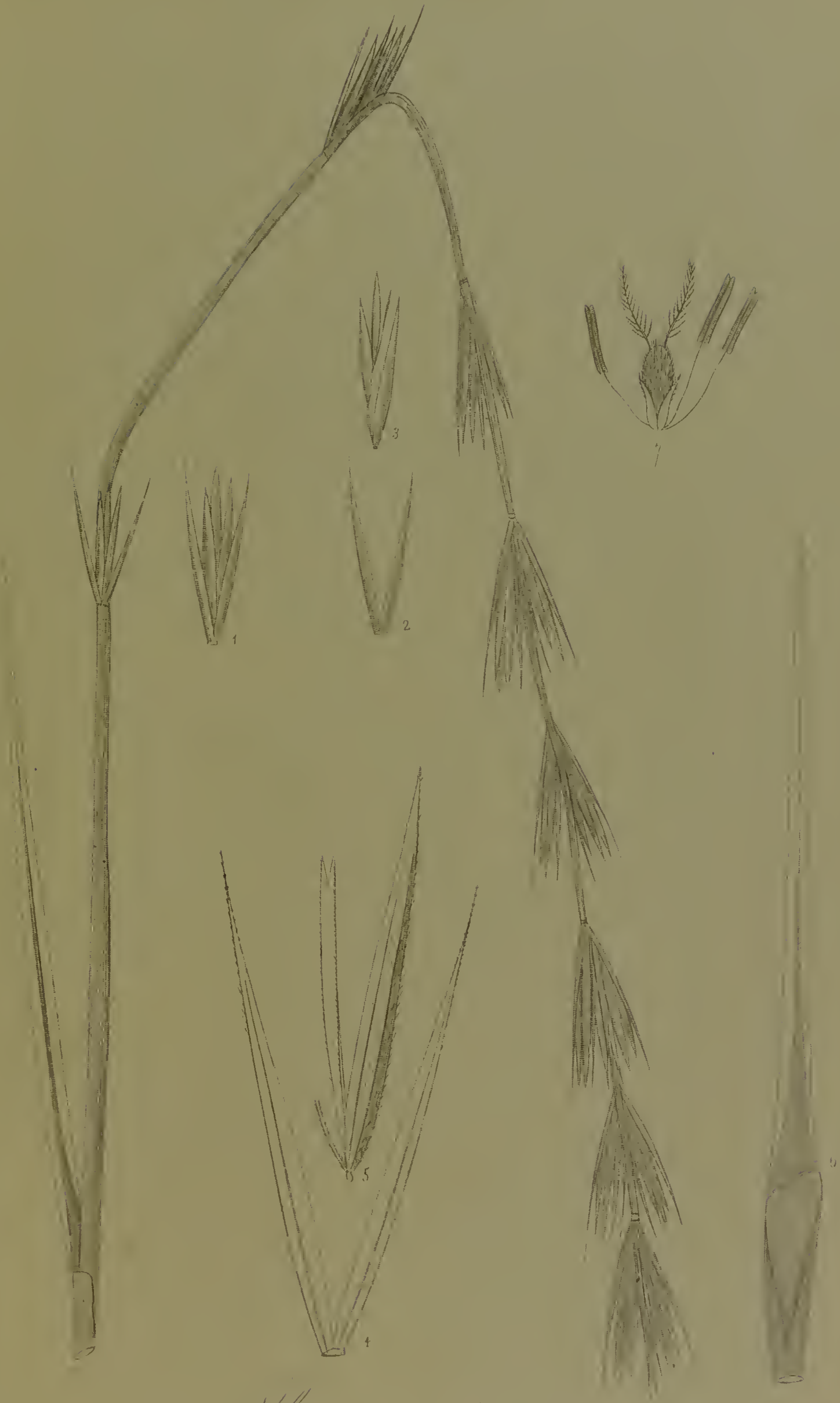
Description. — Root perennial, creeping. *Stem* erect, smooth, striated, and hollow, from two to five feet high, bearing three or four leaves, with long, smooth, striated sheaths; upper sheath longer than its leaf. *Ligule* very short and blunt. *Joints* covered by the sheaths. *Leaves* long, narrow, hard, and rigid, very glaucous, spinous-pointed, folded or rolled in, smooth behind, rough within. *Inflorescence* spiked. *Spike* very long, sometimes two feet in length, at first erect, at length becoming strongly bent at an acute angle at the first, second, or third spikelet. *Rachis* winged, smooth, slightly hairy on the ridges, toothed alternately for the reception of the sessile spikelets. *Spikelets* arranged in pairs on each tooth of the rachis, composed of two glumes and three or four awnless florets. *Glumes* narrow, acute, nearly equal, three-ribbed, roughish, and somewhat hairy towards their points, smooth below. *Florets* to two paleæ, a little shorter than the glumes; outer palea acute, downy, five-ribbed; inner palea shorter than the outer, membranous, cloven at the summit, fringed at the margins. Pedicle of second floret hairy. *Ovarium* hairy. *Styles* two, short. *Stigmas* long and feathery. *Filaments* three. *Anthers* notched at each end. *Scales* acute.

Obs.—Elymus geniculatus is distinguished from *Elymus arenarius*, in the lowermost *floret* being shorter than the glumes by one-fourth, and the uppermost *floret* not projecting beyond the glumes;—whereas in *Elymus arenarius* the lowermost *floret* is as long or longer than the glumes, and the uppermost *floret* always projects beyond the glumes; besides which, it is a smaller plant; *spike* shorter, more compact, and always erect, never becoming bent as in *Elymus geniculatus.*

Elymus geniculatus, Smith, Hooker, Knapp, Curtis, Babington.

4

PLATE CXXXI.



Elymus geniculatus

R. Parnell M.D. del^t et sculp^t

Printed by J. Gellatly

Published by W^m Blackwood & Sons. Edinburgh & London.

This grass is not recommended for cultivation, further than forming a good cover for game. It grows on almost any kind of soil, but thrives best near the sea, on sandy or gravelly links, and is therefore beneficial in rabbit warrens. It is a very rare grass in Britain, having been found only near Gravesend.

Flowers in the second week in July, and ripens its seed in the end of the first week in August.

The accompanying figure was drawn from a cultivated specimen in the Edinburgh Botanic Garden.

Explanation of Plate CXXXI. *Elymus geniculatus*, natural size.

Fig. 1. Spikelet, showing the three florets shorter than their glumes, natural size.
2. Glumes, natural size.
3. Three florets, with a rudiment of a fourth, natural size.
4. Glumes.
5. Floret, showing the two paleæ.
6. Ligule very short.
7. Ovarium, pistils, stamens, and scales.

Magnified.

TRITICUM PINNATUM.

Upright Wheat-Grass.

Plate CXXXII.

Specific Characters.—Awns shorter than their florets. Root creeping.

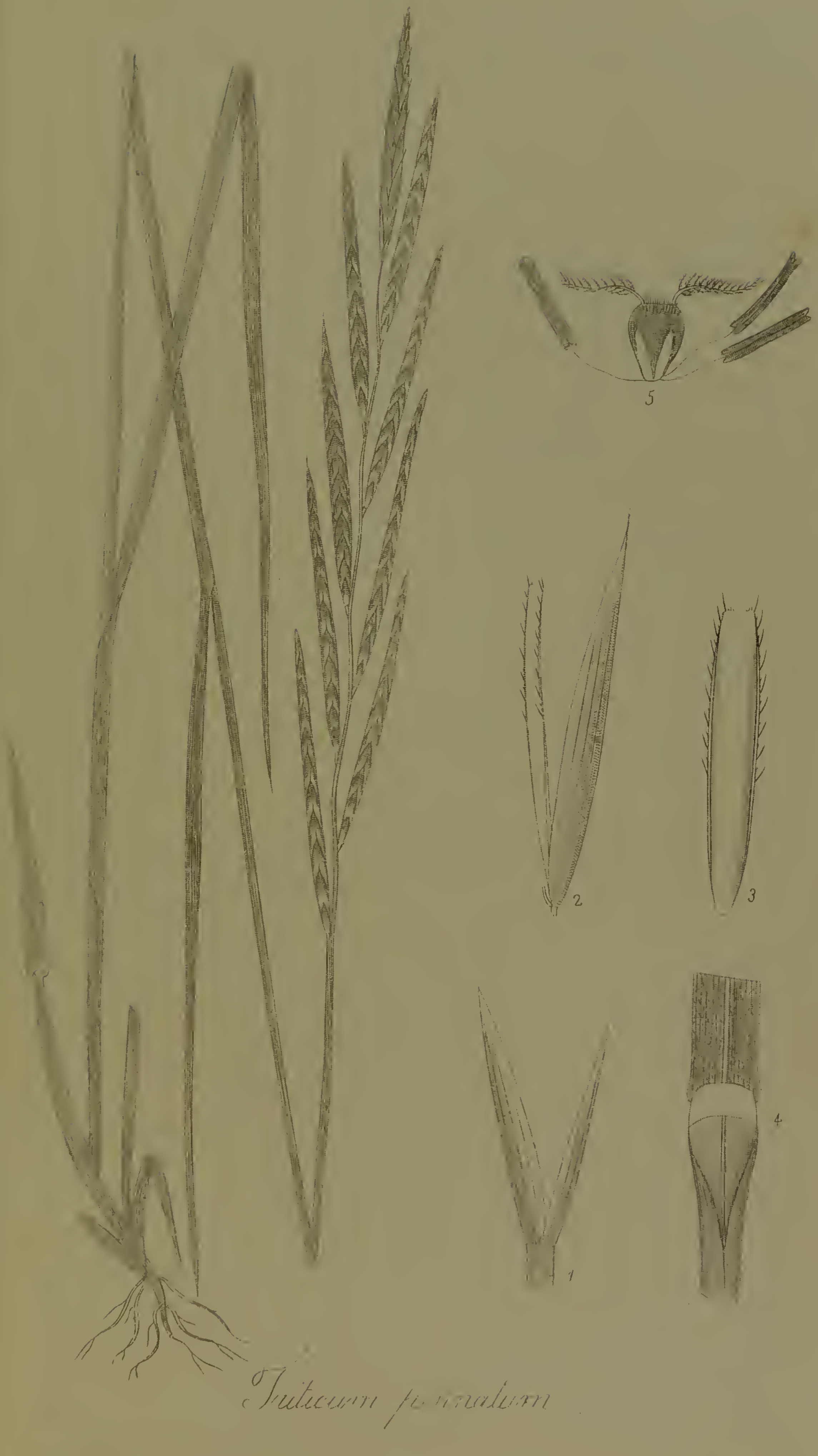
Description.—Root perennial, creeping. *Stem* erect, round, hollow, smooth, and slender, occasionally three feet in length, bearing four or five leaves with striated sheaths; the upper sheath shorter than its leaf; the lower sheaths furnished with hairs directed downwards. *Ligules* short and obtuse, about twice as broad as long. *Joints* usually four, hairy, the first and second remote. *Leaves* long, linear, taper-pointed, rough on both sides, hairy on the upper side, with a prominent central rib extending the whole length. *Inflorescence* racemed, approaching to a spike, the peduncles of the spikelets being very short but distinct. *Rachis* roughish, especially on the inner or grooved side. *Spikelets* erect, long, and linear, usually of ten awned florets and two glumes. *Glumes* unequal, smooth, seven-ribbed, the central rib occasionally prolonged into a point or short awn. *Floret* of two paleæ; outer palea of lowermost floret longer than the large glume, slightly roughish to the touch, seven-ribbed; the central rib terminating in a rough awn seldom more than half the length of the palea, and often much shorter; the uppermost awns being always the longest. Inner palea rather shorter than the outer, obtuse, with two green ribs fringed with white bristly hairs on the upper half. *Styles* two, arising from the summit of the ovarium. *Stigmas* feathery. *Filaments* three. *Anthers* yellowish, notched at each end. *Ovarium* hairy on the summit. *Scales* obtuse, hairy.

Obs.—*Triticum pinnatum* is distinguished from *Triticum sylvaticum* in being of a more upright growth; the *root* creeping, and the *awns* of the florets never as long as the palea;—whereas in *Triticum sylvaticum* the *root* is fibrous, and the *awns* of the upper florets are as long or longer than the palea.

Triticum pinnatum is readily distinguished from the rest of the

---

Triticum pinnatum, Mænch. *Bromus pinnatus*, Linn., Eng. Bot. *Festuca pinnata*, Huds., Smith, Knapp. *Branchypodium pinnatum*, Beauv., Hooker, Babington.



Triticum pinnatum

F. Parnell M.D. del. et sculp.

Printed by J. Gellatly

Published by Wm Blackwood & Sons Edinburgh & London

Triticums in the *outer palea* being seven-ribbed, and the *inner palea* abrupt at the summit; instead of the *outer palea* having only five ribs, and the *inner palea* acute.

This grass is not liked by cattle. It grows naturally on open commons and heathy places, principally on chalky soil, and is not uncommon in the counties of Devon, Oxford, Bedford, Cambridge, Dorset, Somerset, Sussex, Kent, Suffolk, Norfolk, Gloucester, Worcester, Leicester, York, and Cumberland. It is also a native of Norway, Sweden, France, Germany, Italy, Spain, and Portugal. It has not been discovered either in Ireland or Scotland.

Flowers early in July.

The accompanying figure was drawn from a specimen gathered in Dorsetshire.

Explanation of Plate CXXXII. *Triticum pinnatum,* natural size.

Fig. 1. Glumes
2. Floret, showing the two paleæ.
3. Inner palea fringed on the upper half.
4. Ligule.
5. Ovarium, pistils, stamens, and scales.

} Magnified.

There are several varieties of this plant. The following are some of those deserving of notice.

TRITICUM PINNATUM (variety) GRACILE.

Slender Upright Wheat-Grass.

Plate CXXXIII.

This variety differs from the preceding in being of a more slender form, the *spikelets* shorter, the *root* much branched, the *awns* of the florets rather longer, and the *ligule* shorter.

Gathered in Kent in the first week of July.

It is distinguished from *Triticum sylvaticum* in the spikelets not being hairy, and the florets with awns not the length of their paleæ, (see Fig. 2.) It is probably the *Brachypodium pinnatum* (variety) *rupestre* of Koch.

TRITICUM PINNATUM (variety) CÆSPITOSUM.

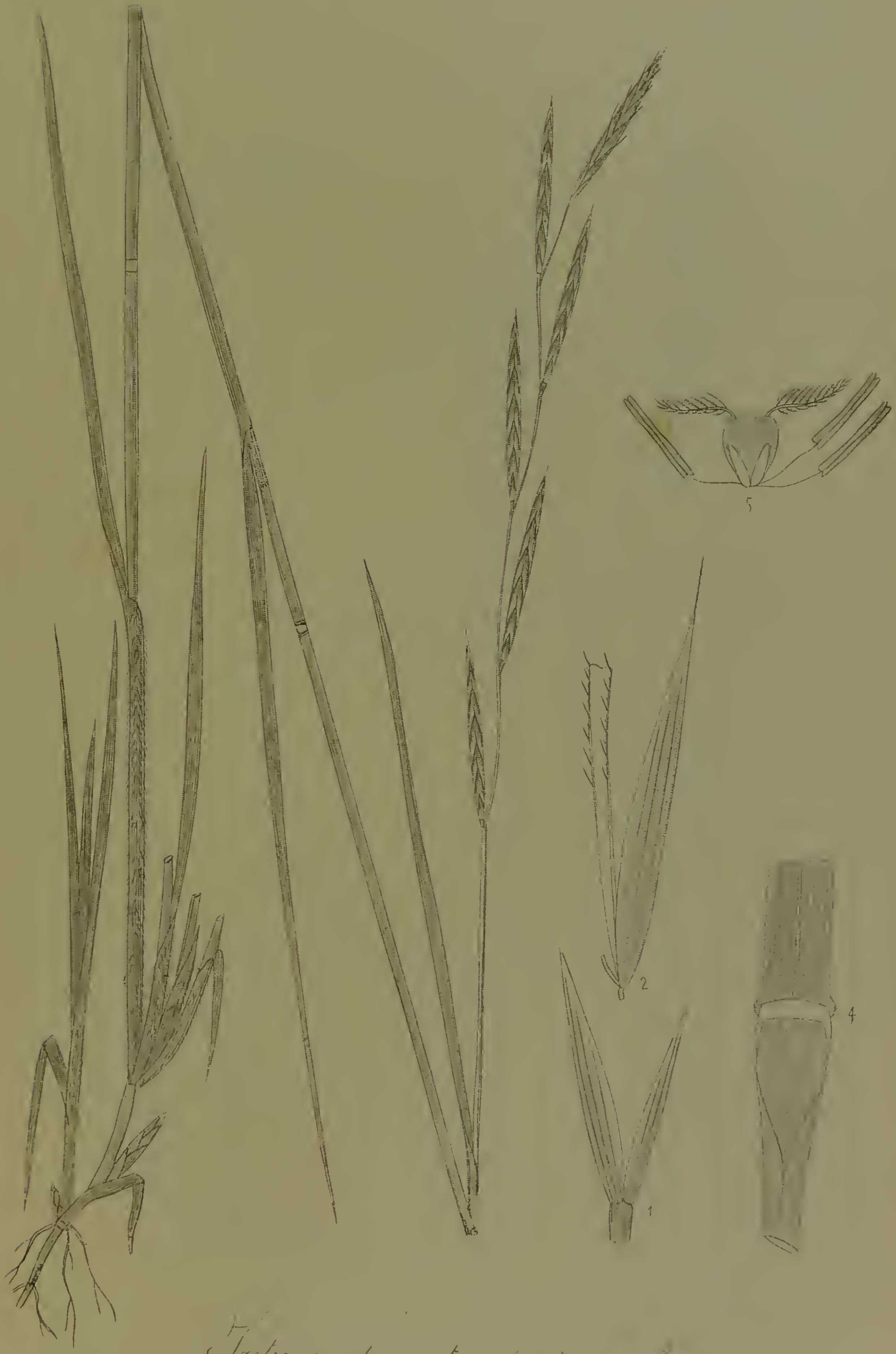
Narrow-Leaved Upright Wheat-Grass.

Plate CXXXIV.

There are several authors who have described this plant as a distinct species under various synonyms, such as *Triticum cæspitosum*, Cand. Kunth.; *Festuca cæspitosa*, Desf.; *Bromus ramosus*, Linn.; *Bromus retusus*, Pers.; *Brachypodium Plukenetii*, Link. Koch and Babington, however, have noticed it as a variety, distinguished in the leaves being narrow; ligule short and truncate; root much branched; spikelets small; and the florets smooth with short awns.

It grows near Bath on chalky soil, and is likewise a native of Norway, Germany, France, and Italy.

Flowers early in July.



Triticum pinnatum (var) gracile

R. Parnell M.D. del.t et sculp.t

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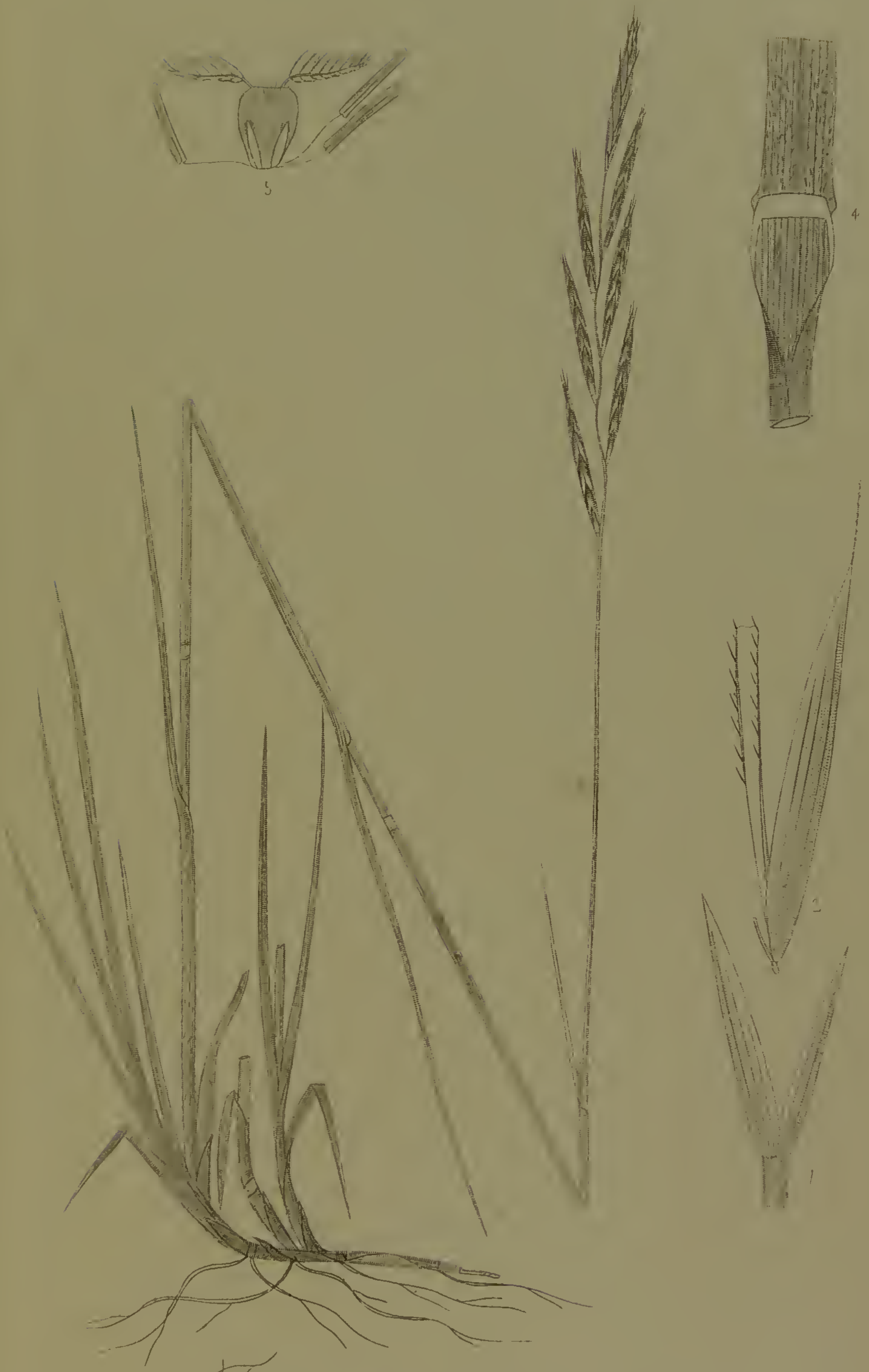

Triticum pinnatum (var.) cæspitosum

R. Parnell, M.D. delᵗ et sculpᵗ

Printed by J. Gellatly.

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TRITICUM PINNATUM (variety) COMPOSITUM.

Compound Upright Wheat-Grass.

Plate CXXXV.

The spikelets arising from the rachis in threes is the principal mark of distinction in this variety, or rather monstrosity.

It was sent me by Mr Gibson, who gathered it in Yorkshire on chalky soil, in the month of July.

It is distinguished from *Triticum sylvaticum* in the florets not being hairy and the awns short.

TRITICUM PINNATUM (variety) HISPIDUM.

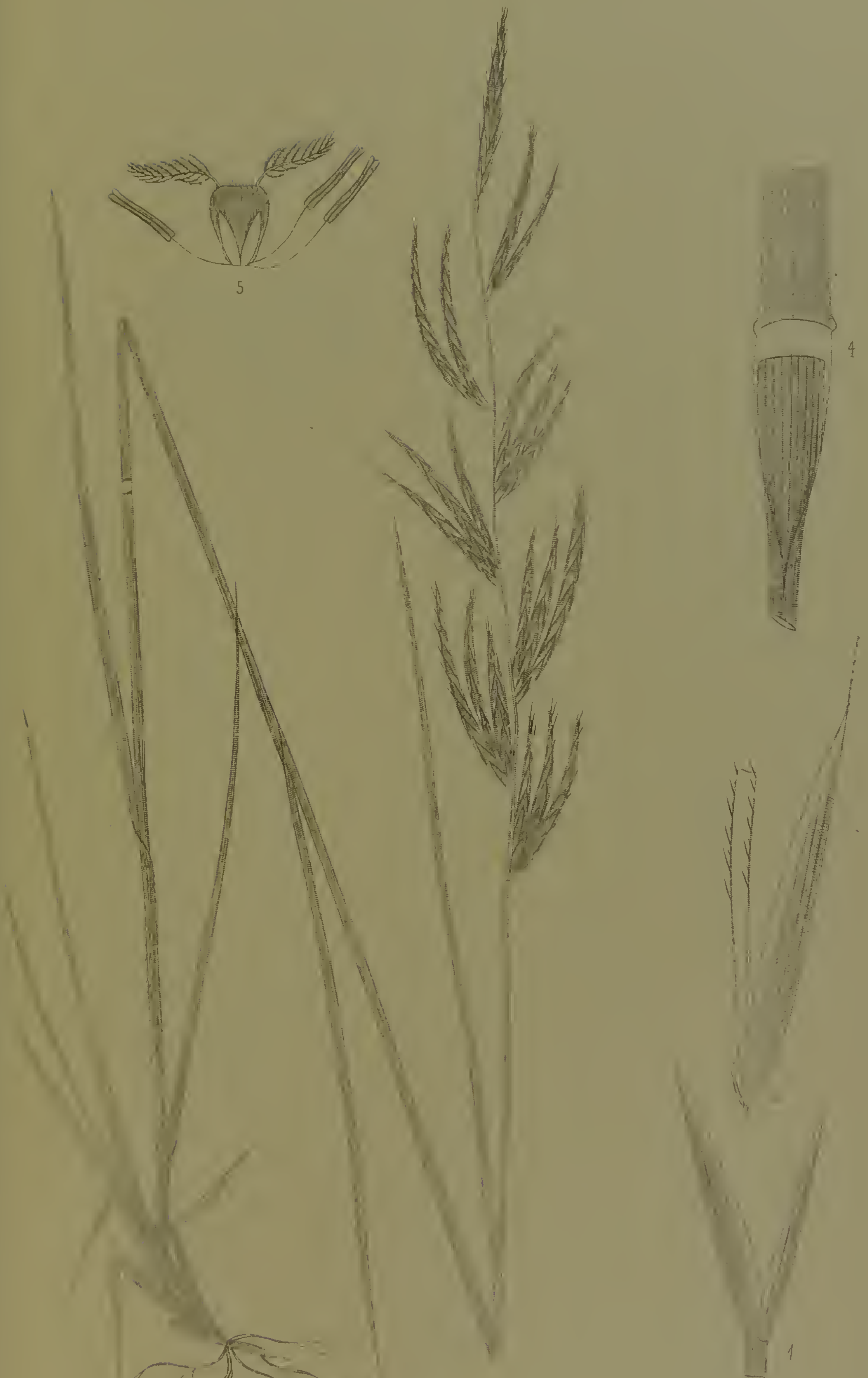
Rough Upright Wheat-Grass.

Plate CXXXVI.

In this variety the glumes and florets are covered with very short bristly hairs producing a roughness to the touch, the root scarcely branched, and the ligule prominent.

Gathered in Yorkshire.

Brachypodium pinnatum (variety) *vulgare*, Koch.

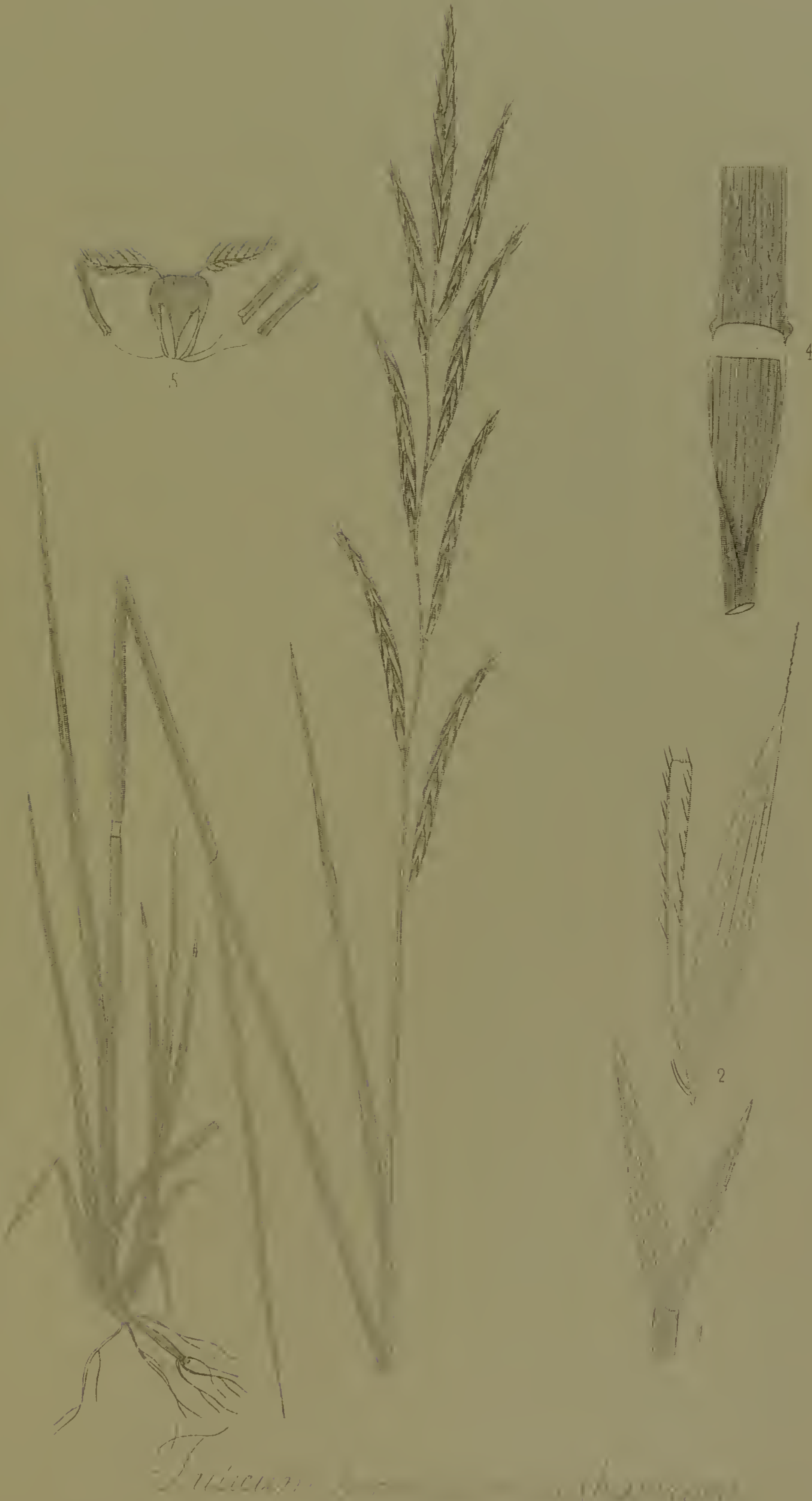


Triticum pinnatum (var) caespitosum

R. Parnell M.D. del^t et sculp^t

Printed by J. Gellatly.

Published by W^m Blackwood & Sons Edinburgh & London



Triticum [illegible]

R. Parnell, M.D. del. et sculp.

Printed by P. Gellatly.

Published by W^m Blackwood & Sons Edinburgh & London

TRITICUM PINNATUM (variety) HIRSUTUM.

Hairy Upright Wheat-Grass.

Plate CXXXVII.

This variety is the same as that described by Koch under the name of *Brachypodium pinnatum* (variety) *vulgare.* It also appears to be the *Brachypodium pinnatum* of Hooker, in which the spikelets are stated to be hairy.

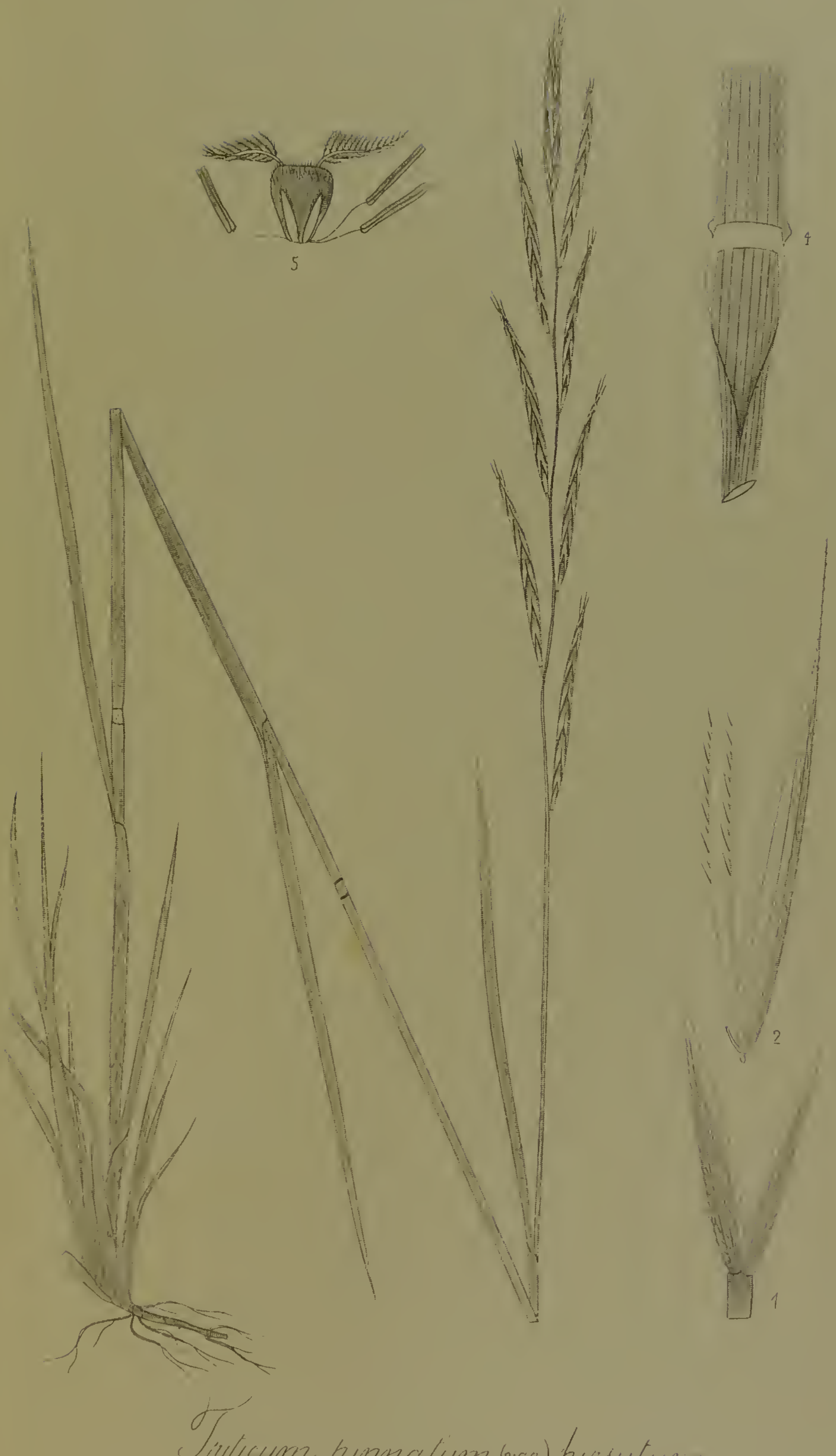
It is distinguished from the five preceding in the glumes and florets being covered with hairs very similar to that observed in *Triticum sylvaticum,* so much so that the two plants are often confounded. The short awns of the florets, however, with the upright growth of the raceme, will distinguish it from *Triticum sylvaticum.*

Flowers early in July.

Gathered in Yorkshire on chalky soil.

Explanation of Plate CXXXVII. *Triticum pinnatum* (variety) *hirsutum,* natural size.

Fig. 1. Glumes hairy.
2. Floret hairy.
3. Ligule short, obtuse.
4. Pistils, stamens, and scales.
} Magnified.



Triticum pinnatum (var) hirsutum

R. Parnell M.D. delᵗ et sculpᵗ

[illegible]

Published by Wᵐ Blackwood & Sons Edinburgh & London

U

LOLIUM PERENNE (variety) ITALICUM.

Italian Rye-Grass.

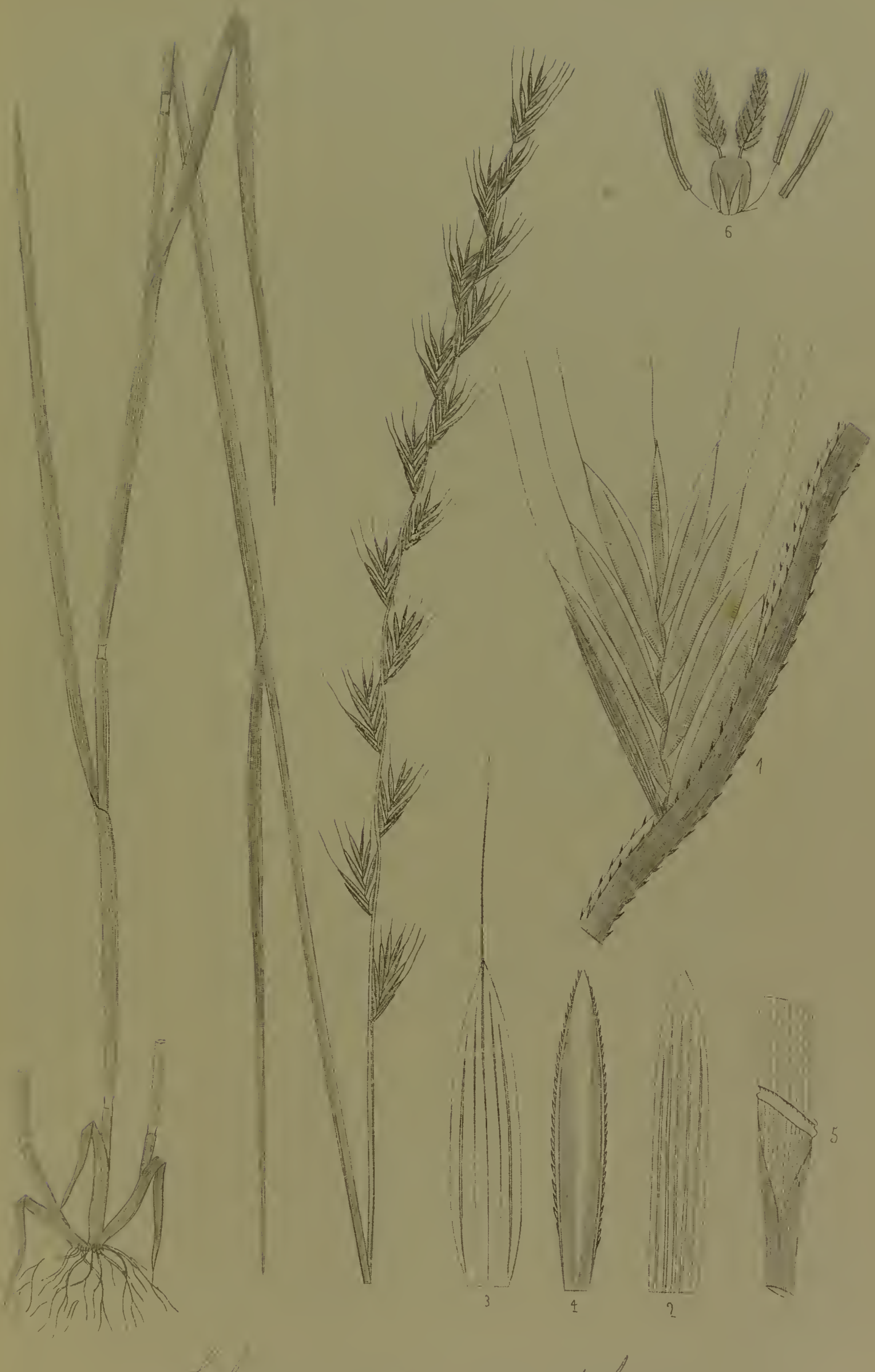
Plate CXXXVIII.

In page 142 I gave a short notice of this grass, and to prevent its being confounded with other varieties, I have here given a more detailed description of the same plant, accompanied with a figure of natural size.

It is distinguished in the spikelets, (the terminal one excepted,) having but one glume, and that considerably shorter than its spikelet. The florets furnished with long awns.

Description.—Root biennial, fibrous, producing many stems from two to five feet in length. *Stems* erect, striated, hollow, more or less rough to the touch, especially when felt from below upwards, bearing four or five leaves with roughish sheaths, upper sheath longer than its leaf. *Ligule* of upper sheath obtuse, very short, about one-fourth as long as broad. *Joints* usually four, the uppermost remote. *Leaves* lanceolate, flat, acute, rough on the inner surface, smooth behind. *Inflorescence* spiked. *Spike* from five to eight inches in length, bearing from fourteen to twenty spikelets. *Rachis* wavy, grooved, rough on the angles. *Spikelets* (except the uppermost one) composed of one glume and from seven to eleven awned florets, the terminal spikelet having always two glumes of nearly equal lengths. *Glume* of a linear-lanceolate form, (Fig. 2), nearly flat, situated on the outer side of the florets, smooth, mostly five-ribbed, equal in length to the lowermost floret; the glumes on the upper part of the spike rather shorter. *Florets* of two paleæ; the outer palea of lowermost floret of an oblong-lanceolate form, five-ribbed; the marginal ribs the most distinct. *Inner palea* about equal in length to the outer, with two green ribs minutely toothed. *Awn* rough, arising from a little below the membranous summit of the outer palea; of various lengths, the awn of the lowermost floret of the terminal spikelet longer than its floret;—whereas the awn of the lowermost floret on the lower spikelets is always shorter than the floret; the awn of the second floret is generally equal in length to its floret. *Styles* two, short. *Stigmas*

Lolium Bouchianum, Kunth, Koch. *Lolium multiflorum*, Babington.



Lolium perenne (var) italicum

Parnell M.D. del^t et sculp^t

[illegible]

Published by W^m Blackwood & Sons Edinburgh & London

long and feathery. *Filaments* three. *Anthers* long and narrow, notched at each end. *Scales* acute.

This grass is a native of Italy, first introduced into this country by Mr Lawson, who annually imports large quantities of the seed for agricultural purposes. The merits of this grass are thus stated by Mr Lawson in a supplement to his *Agriculturist's Manual.* "An experience of ten years since our first introduction of the *Italian* rye-grass into Britain, enables us now to give a more decided description of its habits than formerly. In respect to duration it may be termed subperennial, beyond which title even the most permanent varieties of *Lolium perenne* have no claim. In most instances, two seasons of *Italian rye-grass* are all that can, with any degree of certainty, be depended upon; and in very wet, cold, spongy soils it will often exhibit a thin stock the second season. Instances have, however, occurred in which as many as five and even six successive years' produce have been reaped from the same field; but this has arisen more from the ground having been resown in course of reaping the seed than from the actual duration of the original plants; the seeds being remarkably easily separated from the hay, even although not perfectly ripe, which will always render the harvesting of them an operation attended with considerable care and difficulty.

"Although the tendency of *Italian rye-grass* is to produce many stalks or stems from the same root, yet, from its upright habit of growth, it by no means forms a close turf; hence the propriety of sowing it with a mixture of other grasses of a different habit, which, by filling up the interstices, will add considerably to the weight of produce."

To insure a good and profitable crop of this grass, it will be necessary to cultivate it on a rich deep soil in a sheltered situation, for when sown on light land in exposed situations the produce will not be sufficient to pay the labour bestowed. It thrives best in company with other grass; therefore, the following mixture of seed is recommended for hay and permanent pasture of one imperial acre:—

Italian rye-grass, 2 bushels.

Purple clover, (*Trifolium pratense*,) 8 lbs.

White clover, (*Trifolium repens,*) 6 lbs.
Timothy-grass, (*Phleum pratense,*) 4 lbs.
Bucetum-grass, (*Bucetum pratense,*) 1 peck.
Fescue-grass, (*Festuca duriuscula,*) 1 peck.

"Under favourable circumstances the growth of the *Italian rye-grass* is astonishing; a field sown in October has been cut for soiling in December, and ready for cutting again in April, being then two feet high. But it is only in good land and under good management that this grass becomes so valuable."*

I have frequently known the *Italian rye-grass* confounded with young examples of *Lolium temulentum*, from which, however, it differs in the spikelets having but one glume, and that scarcely half the length of the spikelet;—while in *Lolium temulentum* the spikelets have two glumes; the inner one small, often cloven; the outer, long, about equal in length to the spikelet, (see Fig. 1.)

Explanation of Plate CXXXVIII. *Lolium perenne* (variety) *italicum*, natural size.

Fig. 1. Spikelet on a portion of the rachis, showing the glume and eight florets.
2. Glume.
3. Outer palea opened, showing the five ribs.
4. Inner palea, showing the toothed margins.
5. Ligule.
6. Ovarium, pistils, stamens, and scales.

Magnified.

LOLIUM PERENNE (variety) SUBMUTICUM.

Short-awned Italian Rye-Grass.

Plate CXXXIX.

This grass is a variety of the preceding, differing only in the spikelets being larger, bearing florets with short awns. The seeds are rather heavier, and the stems thicker. It is stated that an acre of this grass will yield as much as 5000 or 6000 lbs. of seed.

The accompanying figure was drawn from a specimen gathered in a field of *Italian Rye-Grass* in the neighbourhood of Edinburgh.

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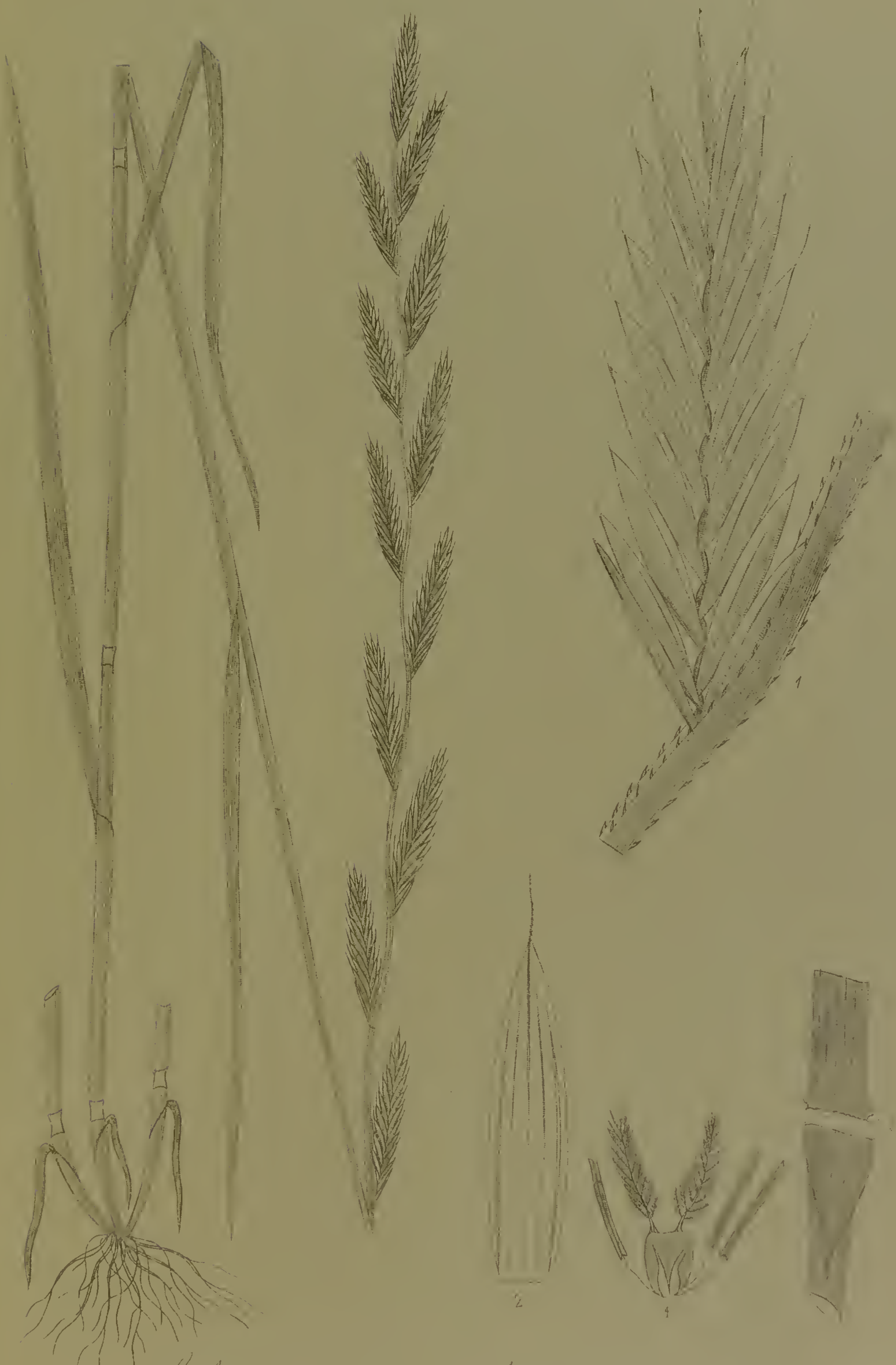
* Murphy on the Grasses of Ireland.



Lolium perenne (var). submuticum

R Parnell M.D. del^t et sculp^t

Published by W^m Blackwood & Sons Edinburgh & London.

LOLIUM PERENNE (variety) MULTIFLORUM.

Many-flowered Italian Rye-Grass.

Plate CXL.

This variety is said to be strictly an annual, in which respect it differs from the two preceding.

It is principally distinguished in the spikelets bearing many florets, from eighteen to twenty in number, with awns longer than their florets, especially the middle ones. It is a stout grass, growing from four to five feet high, and is frequently met with in company with the *Italian rye-grass.* In consequence of its short duration it is not recommended for cultivation. It is a native of Germany and the south of France.

Flowers early in July.

The accompanying figure was drawn from a specimen gathered in the neighbourhood of Edinburgh.

Explanation of Plate CXL. *Lolium perenne* (variety) *multiflorum*, natural size.

Fig. 1. Spikelet on a part of the rachis, showing the glume and nineteen florets. 2. Outer palea opened, showing the five ribs. 3. Ligule. 4. Ovarium, pistils, stamens, and scales.	Magnified.

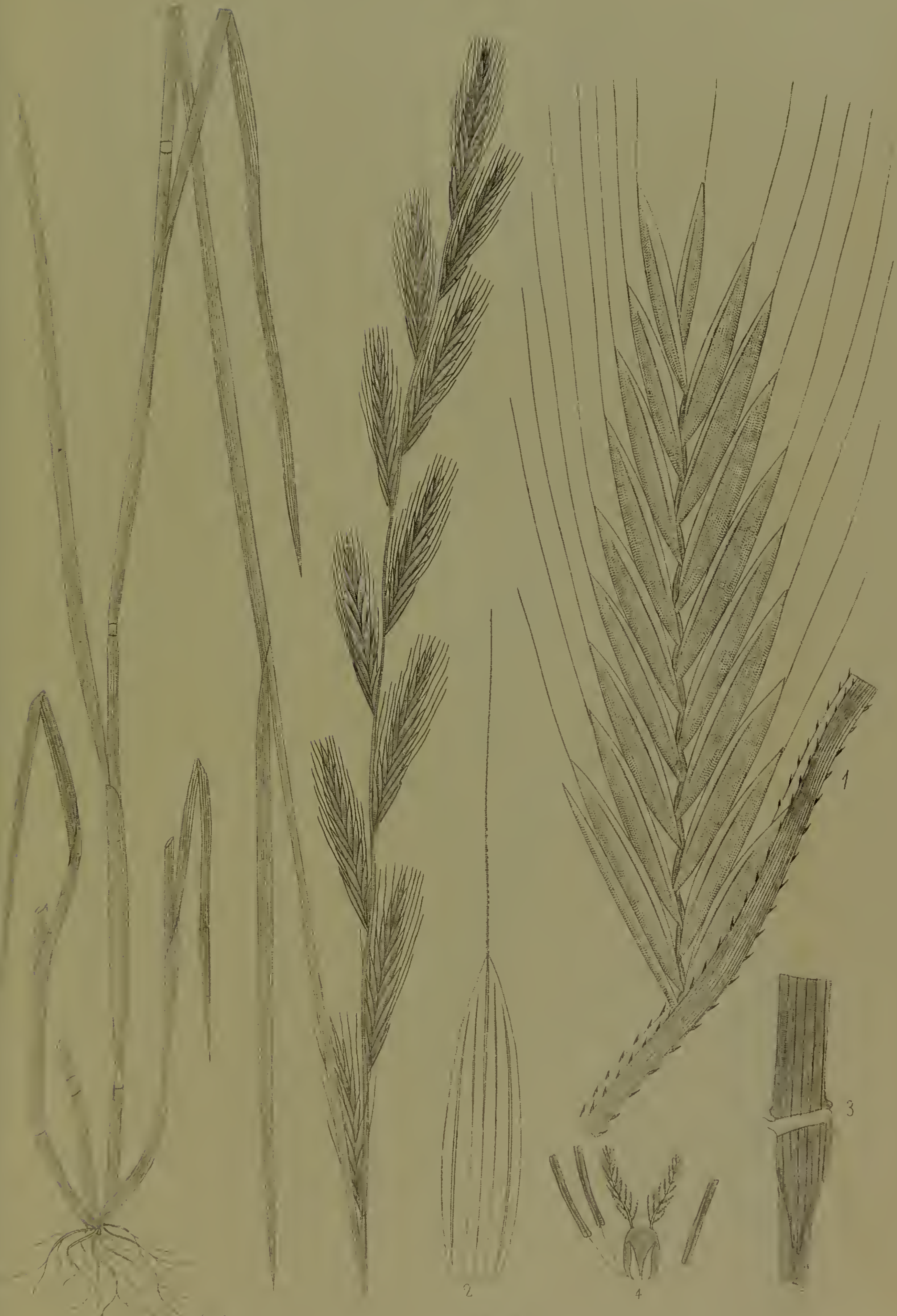
LOLIUM PERENNE (variety) RAMOSUM.

Branched Italian Rye-Grass.

Plate CXLI.

In almost every field of *Italian rye-grass* specimens of this branched variety are frequently met with. It grows occasionally to the height of five feet, and, were it but constant in its form, it would yield a larger crop of seed.

The accompanying figure was drawn from a specimen gathered in Islay.

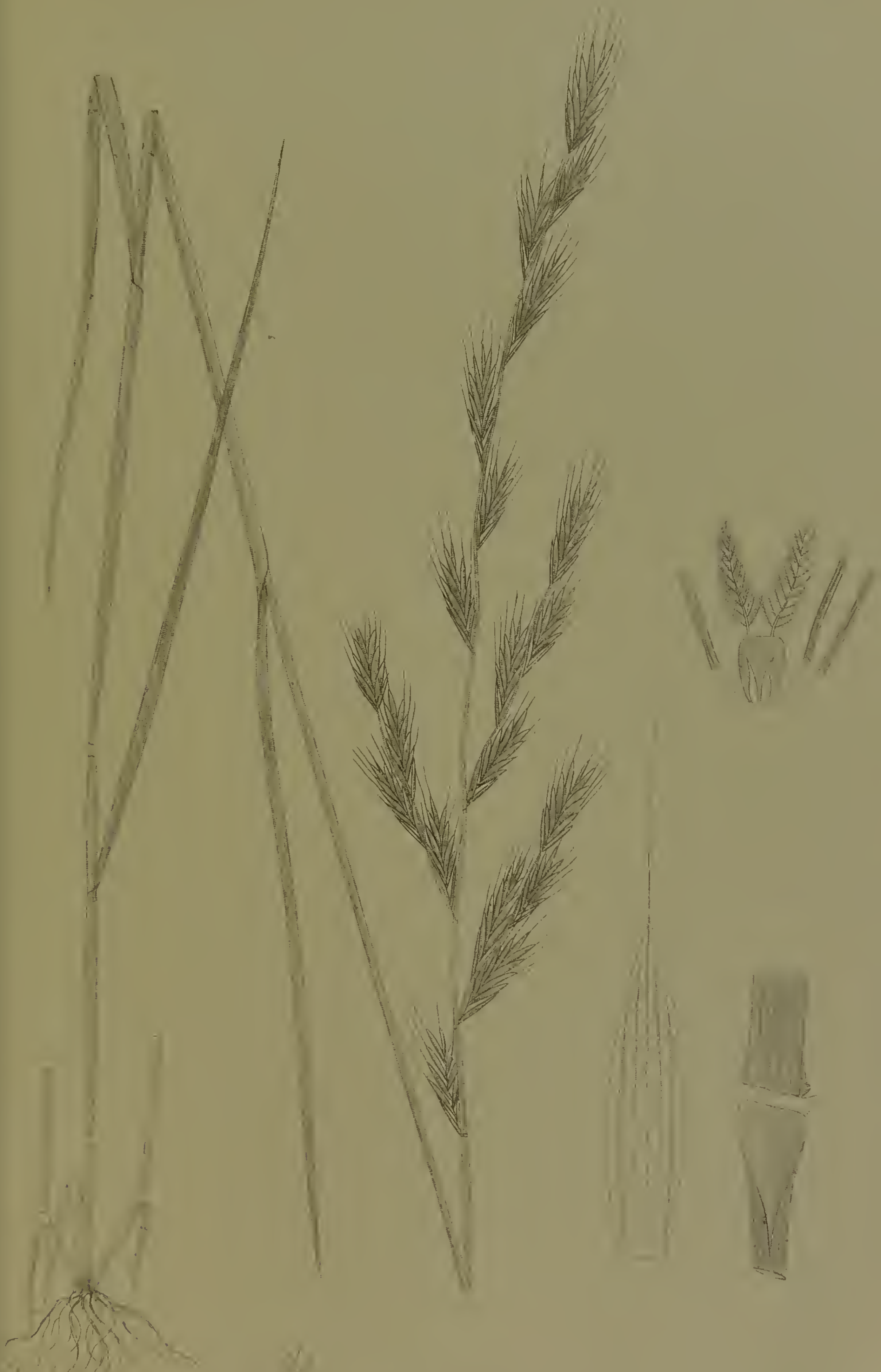


Lolium perenne var. multiflorum

[illegible] del. & [illegible]

Printed by J. Gellatly.

Published by W^m Blackwood & Sons, Edinburgh & London.



Triticum pungens ([illegible]) [illegible]

R. Parnell M.D. del.t et sculp.

Published by W.m Blackwood & Sons Edinburgh & London

LOLIUM TEMULENTUM (variety) LONGIARISTATUM.

Long-awned Poisonous Rye-Grass.

Plate CXLII.

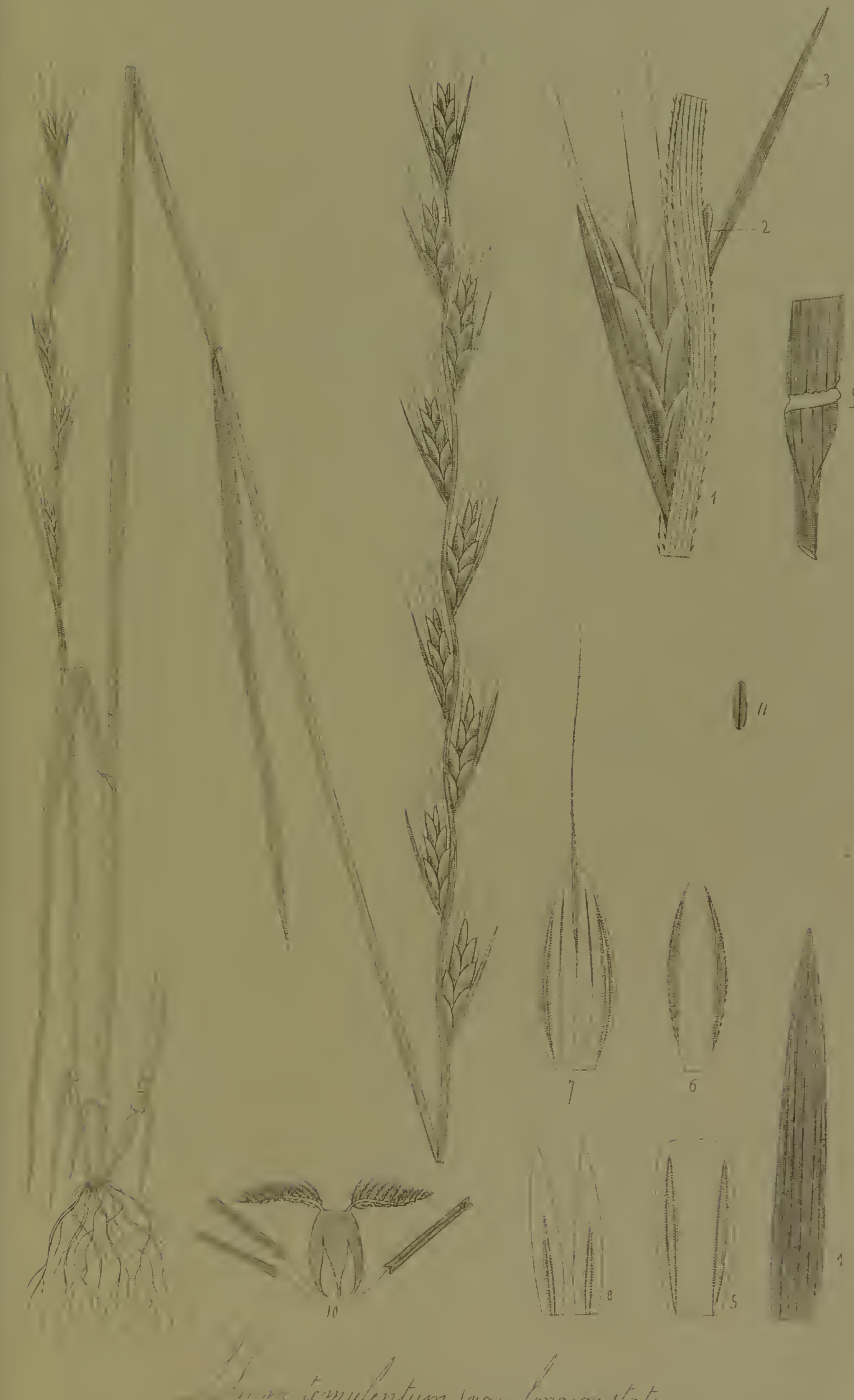
This grass is a variety of the one already described in page 140, differing only in the awns of the florets being longer, and the whole plant of a stouter habit of growth. It grows in the same situations, and equally common, and the seeds possess the same deleterious properties. Of late a case of poisoning caused by this grass has been recorded. The symptoms produced were somnolency, convulsive tremor, and coldness of the extremities. M. Ruspini says that the adulterated flour may be detected by digesting in alcohol, which, when *Lolium temulentum* is present, assumes a characteristic green tint.

This grass is known from the *Italian rye-grass,* to which it bears some resemblance, especially in the young state, in the spikelets bearing two glumes; the inner glume short and thin, (see Fig. 2); the outer glume long, equal in length to the spikelet, (see Fig. 1);—while in the *Italian rye-grass* the spikelets have but one glume, (the terminal spikelet excepted), and that not more than half the length of the spikelet.

The accompanying figure was drawn from a specimen gathered in Cantire.

Explanation of Plate CXLII. *Lolium temulentum* (variety) *longiaristatum,* natural size.

Fig. 1. Spikelet on the rachis, showing the glume and seven florets.
2. Inner glume small and thin.
3. Outer glume.
4. Outer glume, showing the ribs.
5. Inner glume, showing the ribs, which are of a light green.
6. Inner glume, sometimes cloven.
7. Outer palea opened, showing the five ribs.
8. Inner palea minutely fringed.
9. Ligule very short.
10. Ovarium, pistils, stamens, and scales.
} Magnified.
11. Seed, natural size.



Lolium temulentum (var.) longiaristatum.

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[illegible]

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CORRIGENDA.

PART I.

Page 19, line 15, *for* much longer *read* much shorter.
37, line 1, *for* five-ribbed *read* four-ribbed.
45, 46, *for* Molinea *read* Molinia.
82, line 4, *for* pointed *read* obtuse.
106, 108, 109, *for* Bucetum elatior *read* Bucetum elatius.
121, line 20, *for* five-ribbed *read* seven-ribbed.
122, *for* Avena pratense *read* Avena pratensis.

PART II.

Page 200, *for* Hair's-tail *read* Hare's-tail.
208, *for* silicious *read* siliceous.
272, line 18, *for* is *read* in.
280, line 2, *for* than half its *read* than its.
288, line 16, *for* to *read* of.
290, bottom line, *for* Branchypodium *read* Brachypodium.

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